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SEA POWER AND TO-DAY'S WAR

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by

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METHUEN & CO. LTD. LONDON

36 Essex Street, Strand, W.C.2

First published in Great Britain in 1940

PRINTED IN GREAT BRITAIN

TO
HAL SMITH
WHOSE IDEA IT WAS

PREFACE

THIS BOOK, a purely technical study of the strength of the sea powers and of their tactics and strategy in the event of a general war, was written during the summer of 1939. At that time the advent of a general war appeared sufficiently inevitable to justify such a book. The author was not one of the people who believed in the early advent of such a war. The considerations presented here below led him to state in the preface originally written for this space that 'there are a good many reasons for believing such a war may be long delayed, and even prevented until the entire political atmosphere has changed'.

The political atmosphere of Europe changed abruptly in the last two weeks of August with the signing of the Russo-German agreement and the war was launched while the proofs of this book were being revised. With regard to the book the conditions under which war has come make two changes, one verbal, one of content. The war substitutes the straight future tense for the conditional, 'will' for 'would'. The conditions of the war also remove from Germany the shadow of Russian danger (never very potent by sea as the text will show); and by turning Russia into a friendly neutral, they guarantee to Germany a continuing supply of the war material of which the latter was most desperately in need—oil. The Caucasian fields are perfectly adequate to supply Hitler for as long a war as he cares to fight, provided only that transportation lines can be kept open.

In three other essential materials—cotton, manganese, wool—Russia can wholly or partly meet German needs. German chemists have been extraordinarily successful in finding substitutes for another—rubber, though whether

these substitutes can meet the demands of a war is yet uncertain. Thus the special conditions of the present conflict limit the effectiveness of the blockade to depriving Germany of a portion of her food needs, copper and the alloy metals.

Germany evidently thinks she can meet the food needs from Eastern Europe. Of copper and the alloy metals, as outlined in this book, she has built up large reserve stocks. In the last war it was not until the middle months of 1918 that German shells began to appear with zinc driving bands substituted for copper and German cartridge cases in cast iron began to be found on the battlefields. It is thus doubtful whether the lack of these 'essential' materials can make its influence felt to a degree sufficient to overbalance the effect of military operations.

The neutrality of Italy and the Balkan countries is another factor operating to vitiate the effects of blockade. It is apparently the conviction of the German leaders that by these neutralities, by the Russian agreement, they have successfully insulated themselves against the operation of sea power and have limited the conflict to a field in which Germany is at her strongest. Otherwise there is no good reason why the conflict should have been precipitated at the present time instead of five years from now when the Axis sea power would have been at its height.

Meanwhile, it is by no means certain that the neutralities on which the Germans are counting can be maintained in the face of the tremendous pressures that will presently develop against them. The moment they disappear sea power with all the details outlined here, comes into operation.

The deductions here are offered with some diffidence. The information on which they are based is of a type that most governments like to conceal, and the facts are not certainties, merely the best available data, which may be wrong in essential particulars. A good case of how wrong even authoritative sources can be is that of the French heavy cruiser *Algérie*. When she was built, foreign journalists and even naval men were allowed to look her over. Some of them, by one means or another, measured the thickness of her armour belt and agreed that the officially announced thickness of four and a half inches was correct. It was not till nearly three years later that it came out that *Algérie's* armour had been laid on a hull nearly an inch and a half thick and itself of armour steel, so that her effective armour belt is nearer six inches than four. Similar errors and official concealments will make many of the details in this book incorrect. It is not believed that they will vitiate the general conclusions.

Many thanks are due to Mr. Hanson W. Baldwin of the *New York Times* for his generous co-operation and to his excellent book *The Caissons Roll*. Use has also been made of Major Eliot's *The Ramparts We Watch*; Emeny's *Strategy of Raw Materials*; Jane's *Fighting Ships*; Weyers *Taschenbuch der Kriegsflotte*; *Floties de Combat*, and the articles of Dr. Oscar Parkes.

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**SEA POWER AND
TO-DAY'S WAR**

I

BACKGROUND:

FAREWELL TO THE BATTLESHIP

THE MOST STRIKING FACT about the Washington Naval Limitation Treaty was that it existed. The diplomats who negotiated the several instruments jointly known under that title had been assembled to relieve the world of the weapons that had made the war of 1914-18 so intolerably costly in lives and material resources. Amid hosannas from newspaper editors they announced a success which seemed confirmed when admirals of all the navies represented began complaining that the national fighting power had been crippled. More decisive still was the fact that over a million tons of warships were destroyed as soon as the treaties had been ratified. 'This treaty absolutely ends naval competition for all time,' said Charles E. Hughes.

Now that the clamours have died away it becomes increasingly clear that the conference was one of the most monumental failures in diplomatic history. Instead of limiting arms for anybody it increased them for everybody, even including those minor powers not represented around Mr. Hughes's table. But it was not till the true story of the gathering began to leak through the protective coating of Press releases that the fact, as well as the reason for the fact, appeared. The reason was briefly this: none of the nations represented was willing to renounce force as an instrument of policy, or of 'self-defence', as their representatives put it.

Thus France had the largest, the best equipped, and the most powerful army in the world as of the date of the conference. Her delegates opened the proceedings by

declaring that this army was their guarantee of security and they would hear of no limitation on it unless that security were otherwise provided for. When definitions were requested, it appeared that the security the French had in mind was that of the Continental European arrangement for the benefit of France achieved by the Versailles Treaty; and the guarantee desired in exchange for a reduction of armaments was an undertaking by England and America to support the Versailles arrangements by force of arms if necessary. As the American administration had been elected to office on a platform rejecting a far less radical French alliance, the answer was obvious. So was the French refusal to consider any restraint on armies. The conference, which had begun as one to discuss all the material of warfare immediately turned into a purely naval matter, a fact lost to sight to the enthusiasts who applauded its results at the time.

Even in this more limited field it soon became evident that the French formula of 'security—*my* security' was the only one on which the delegates could agree. When the idea of limiting cruisers was mentioned Arthur Balfour for England spoke of 'the hard, brutal necessity of plain and obvious facts', and declined to hear of any limitation on this type of ship. They were needed to protect Britain's long overseas food-line. England would, however (he suggested), look with favour upon the total abolition of the submarine, the severe limitation in size of the battleship, and the prohibition of the aircraft-carrier. (There would remain only small battleships, just capable of making the short sea-jump from one of England's numerous bases to another, and cruisers, a class in which England possessed more ships than any other nation, more, indeed, than all the rest of the world put together.)

The Americans replied that the whole object of the conference was to relieve the world of the cost of armaments; that is, to give every nation cheap security. Was it not far cheaper to defend the longest coast-line and the widest ocean of the world with a few aircraft-carriers than with a large number of expensive cruisers? A prohibition on aircraft-carriers would be disagreeable. Nor was it to be expected of a navy that must operate far from any base that it would consent to reduce the unit size of battleships below a figure that would enable those battleships to operate at long ranges. And if battleships were needed, so were destroyers to scout for and to protect them. But the United States would willingly consent to restrict cruisers and submarines, which made war only on unarmed commerce, and would like to see the total number of warships in the world much reduced—provided the reduction were proportionate to the number of ships now held. (The United States had only three cruisers afloat; manœuvres had shown the small American submarine incapable of accomplishing much in the vast ocean reaches; but the Wilson building programme had brought near to completion a battleship fleet more powerful even than England's, and the largest destroyer flotilla in the world.)

The Japanese thought a distinction should be drawn between defensive and offensive naval weapons. The battleship and aircraft-carrier (they said) were essentially offensive, suitable for the support of invasions. The submarine, the torpedo boat, the small cruiser, were just as clearly pure defensive weapons. Japan would willingly abolish large ships of every kind; would like to see the destroyer restricted; but could not consent to the abolition of the submarine. (In Japanese yards lay the half-finished hulls of six giant submarines, capable of running

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from Yokohama to Panama, and Japanese ships, by restriction on living quarters, were smaller than those of any other nation.)

France agreed that the aircraft-carrier was an offensive weapon and should be forbidden; the submarine defensive and to be encouraged; and since French building costs were the lowest, suggested a limitation by limiting the amount to be spent on warships by each nation. Italy put forward no claim but one for a theoretical equality with France which she did not possess in practice.

In other words, the conference differed from the hundreds that had preceded it since Western Europe ceased to be a tribal hunting-ground mainly in being played at a bid of nullos. Each of the participants was willing to abandon the weapons most useful to some one else. None was willing to give up a tool that had obvious value against a possible opponent. In the abstract it is remarkable that any scrapping at all was done—that the limitation did not consist (as it did at the later London conference) in building a roof some distance above the highest peak in naval construction any nation had yet envisaged.

That it produced anything at all was due to two factors. The conference followed close on the heels of a conflict that had borne with greater weight on the civilian population than any since the Thirty Years War; and all the nations but one were parliamentary democracies. The combined effect of these facts was that none of the delegations dared face the home chambers and home newspapers without some achievement that could be magnified into a step to lift the burden of war from the planet. The conferees therefore agreed to impose an apparent limitation on the weapon that had

rendered the least return for investment during the First World War.

It would be unfair and inaccurate to describe the decision as one of conscious hypocrisy. The delegates simply found themselves beyond a meeting of minds on so many points that they discovered with delight a point on which all could agree—namely, that the battleship had not paid for its keep in the past, and that its future was doubtful.

II

Some 121 first-class vessels of the battle line, costing from ten million to forty million dollars apiece, had been under the flags of the fighting nations during the war. In four years they had appeared in actual combat only during about four hours of the misty afternoon of May 31, 1916, and then for an exchange of pawns which decided nothing but that battleships were too valuable to be risked in any more such experiments.

'The Commander-in-Chief,' said the British official history of the naval war, 'informed the conference that it was, in his opinion, no longer desirable to provoke a fleet action, even if opportunity should occur.' The date was January 1918, when the British battle-fleet, with the addition of six American ships, stood at its highest superiority over the German.

Battleships had proved brittle. *Audacious* sank inexorably after touching a mine, though the weather was calm and much help near. *Indefatigable* blew up the first time she was hit, and *Queen Mary* exploded twenty minutes after coming into action. A huge investment in minor craft was consumed in protecting the blubbing giants from such enemies as submarine and torpedo boat—so huge an investment that England had come measurably

near to losing the war paradoxically because she had the largest fleet of battleships. For so many of Britain's destroyers were tied to the duty of protecting the battle-fleet against submarines that it was impossible to furnish convoys to the merchant shipping whose losses were starving England out of the war. Only the arrival of American reinforcements saved the situation.

War experience also demonstrated that of all classes of ship the big, expensive battleships had the shortest life, were the most useless when their prime had passed. In 1914 all the warring nations possessed considerable squadrons of 'pre-Dreadnought' battleships, designed before the launch of the first all-big-gun, all-big-armour vessel. They were obviously unfit to lie in the line of battle against dreadnoughts, but many were as little as five years old, and no high command could bring itself to discard so prodigious an investment in money, labour, and equipment. They were, therefore, retained to do odd jobs in the war at sea.

Without exception they had proved useless death-traps. Several (*Formidable*, *Danton*, *Britannia*, *Wien*, *Pommern*) were sunk by single torpedoes from cheap, diminutive craft they never saw, and, sinking, carried a thousand men apiece to the bottom. Several more (the only time any of them got into action) wore out the rifling of their guns in an absurdly futile bombardment of the rocks overlooking the Dardanelles. After three of their number had been mined in a single day, with another heavy butcher's bill, the remainder were withdrawn.

Meanwhile, much older ships of other types had given a good account of themselves. At the battle of the Falkland Islands the ancient British cruiser *Kent* made more speed than on her trial trip, cutting down a fast

and fairly new German commerce destroyer. By battleship standards the German cruiser *Emden* was hopelessly obsolete when she took the seas, yet she accomplished more than any other ship of the Kaiser's navy. Other old German cruisers were the mainstay of the attack on the Gulf of Riga. An old submarine sank three British cruisers. A division of American destroyers dating from the Spanish War voyaged half round the earth from the Philippines and did yeoman service in the Mediterranean.

In short the experience of the war appeared to indicate that the battleship had reproduced the history of the dinosaurs to the point where a law of diminishing return began to operate against size. Further increases were no longer accompanied by a proportionate gain in strength, the brute was already having difficulty doing enough useful work to keep itself alive, yet unit sizes continued to increase and no one dared build small battleships while there were larger ones afloat.

Nor was poor performance the only indictment against the battleship. There was also the menace from the skies. It was only ten years since the aviation meet at Issy-les-Moulineaux, where a five-mile flight had been considered an excellent performance, and less than ten years since Blériot made himself world famous by spanning the English Channel. Yet already the Atlantic had twice been crossed through the air, and there seemed little reason to doubt that the curve of aviation development had permanently become a vertical.

If this were the case another ten-year period was bound to produce an air arm that would render the battleship extinct, a flying warship that would use elevation instead of propellants to send charges of explosive crashing into the vitals of surface ships. The warship's guns had proved of little value against such attack.

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Already on the morning after Jutland the entire gun-power of the British battle-fleet had proved insufficient to drive off a single German Zeppelin, and compared to the aeroplane the Zeppelin was a thing of gossamer, ready to burst into flames at a touch.

Thus the experience of the World War and a not unreasonable view of the future alike suggested that command of the sea on the old terms, by a force of battleships so powerful they need fear no adversary, had become impossible. Von Tirpitz and the Wrights had abolished Mahan. The whole concept of naval strategy would have to be recast on new and more complex lines, on a system in which no single type of ship would have a dominant place.

Viewed in another light, the situation was not unlike that prevailing after the American Civil War. A rush of new inventions—armour, the ram, high-speed steam-engines, rifled cannon, iron ships, the turret and torpedo—had utterly destroyed the utility of the wooden line-of-battleship with its many tiers of guns. But the inventions were still in the formative stage; it was impossible to absorb all of them into a single new type of ship, and no one knew what the form of a battleship involving the most important inventions should be. Naval construction had declined to a minimum during a period of experiment in which the relations and combinations of the new weapons were worked out. During that period fleet tactics, the science of bringing the full power of weapons to bear on a present adversary, had fallen into a state of flux. Strategy, the art of combining the same weapons against an opponent at a distance, had temporarily ceased to exist.

The technical obscurity as to the future of naval war at the time of the Washington Conference was by no

means as deep. Yet it was deep enough, the weakness of old battleships and the cost of new ones were obvious enough, so that when the delegates asked their technical advisors what ships could best be spared from the fleets, the answer was always, 'Battleships'.

That is, old battleships—the death-traps built before the *Dreadnought*. In England's case there could be spared also the early ships of the dreadnought type itself, botched together in the hours of the building race with Germany, when it was more important to get guns into the battle line than ships that should stand the enemy's fire. France, and Italy had the skeletons of giant new battleships, designed and begun before the war, postponed for lack of labour and materials, which would now have to be re-designed and rebuilt; they could go too. The United States had the ships of the Wilson programme on the ways. It was unlikely that a Congress bent on returning to normalcy would find funds for their completion, and they also could be thrown into the melting-pot.

It thus became possible for a conference which was really agreed upon nothing, which was determined to do away with no useful weapon, to achieve an appearance of cordiality, to make a pretence of sacrifice. The treaties destroyed a million tons of ships that had already become scrap-iron and made the occasion one of public rejoicing. They could not have existed on any other terms.

III

The naval limitation agreement was thus a swindle on the people of the world by its title; a wrapper in spectacular colours placed around a present which the admiralities would in any case have been forced to lay before their taxpayers. The exiguous restrictions it

contained were bound to be discarded as soon as the tactics of the new inventions had been worked out—always provided that the genuine will-to-peace which had been absent from the deliberations did not make itself felt in the interim.

There was a fairish chance that this might happen. It took from 1865 to the middle 1890's, thirty years, for naval men to decide where the inventions of the American Civil War were leading—to evolve types of warships that embodied these inventions in their best forms. A similar time-lag, in the new age might have changed everything. In the four parliamentary democracies the people had been over-sold by the publicity with which the 'achievements' of the conference were announced. Admiralties discovered, somewhat to their consternation, that it was difficult to extract appropriations for any warships whatever from deliberative bodies whose members read the newspapers. Thirty years of abstention might conceivably have hardened this non-building into a custom, difficult to overturn, and that custom would have been true disarmament.

But the time-lag was insignificant and the precedent was never established. In the first place even the democracies had come to the conference table not so much to have peace as to have a peace that imposed their will on the world, the specific Peace of Versailles. France, for example, never considered the settlement of outlying questions as regards Germany without the use or threat of force. She did not even consider there were any outlying problems; the Versailles Treaty settled everything in a manner satisfactory to her. This attitude may have been justified by the German character and record, but that is not the point. The attitude existed, was not confined to French politicians, bankers, diplomats, admirals,

or ditch-diggers, and, by existing, made genuine disarmament impossible.

In short the French people were determined on peace, but a form of peace that would make French will dominant when any question arose on the European continent. England similarly wanted peace with control of the sea-lanes, Italy peace plus colonies, and America a peace which would keep her politically isolated from, but economically united with, Europe.

In the second place there had been among the conferees one nation that was hardly even technically a parliamentary democracy; that was not war-weary, but in the midst of the armed imperial expansion phase from which the others had escaped half a century since; that regarded the whole business of the naval conference not as a general swindle, but as a specific swindle directed at her. Japan.

IV

The Japanese trouble could be diagnosed as hunger complicated by an acute inferiority complex. There is no question that the islands were suffering from an over-population so serious as to endanger even the relatively low standard of living to which their people were accustomed. There is no doubt that this problem was growing more serious in geometrical proportion. How far the ruling classes of Japan had already determined to relieve this pressure by expansion into China is a secret that remains locked in the minds of those statesmen. But while the European countries were engaged in cutting each other's throats there had already been made on China those twenty-one demands which were in effect a single demand—that the vast, rich, moribund empire be turned over for Japanese exploitation.

The reception accorded these demands by China was such that it had become evident some fighting would sooner or later take place there; and the effect on the United States had been such as to encourage the idea that as soon as America got free of the World War she would plunge into what Japanese consider the favourite American sport of minding other people's business.

At the time Japan felt both eventualities were reasonably provided for. A campaign against China would be based on the sea and the support of ships for armies working along the lines of the great Chinese rivers. There is one case and one alone where old warships of every class are of great military value, and that is the case where they are called on to operate, not against other ships, but against troops on land and hasty field fortifications. Old German warships crushed the flank of a Russian army at Riga. A pair of old Austrian river-monitors, built as long ago as 1866, were the deciding factor in the attack on Serbia. Japan, like the other sea powers, had a great collection of old warships, useless for sea operations. Unlike the others she could use them for a military purpose—against China—without weakening her main fleet.

Japan also had on the building ways the ships of her 'eight-eight' programme—eight battle-cruisers larger than any yet designed, eight battleships. Completed, they would make her fleet capable of standing off anything the United States could bring against her, especially if she conducted operations from the interior lines of the Yellow Sea, far from American bases, close to Japanese. Finally, Japan had a naval alliance with England, negotiated after her brilliant victory over Russia. In the World War she had loyally fulfilled her obligations under

that alliance and now not unreasonably felt it was time to collect the profits.

On the emotional side the Japanese were immensely proud of the English alliance. It was their physical proof that they had reached national maturity; that in spite of the exclusion laws of Canada and the United States, they were not looked upon as an inferior race.

But the alliance had a time clause, and it was exactly at the date set for its renewal that the Washington Conference was called. At the conference everything went wrong for Japan. Under pressure from Canada and Australia, England abrogated the precious naval alliance. Under pressure from her own business interests England aligned herself with the United States against Japanese adventures in China, and among the naval treaties slipped in a document intensely humiliating to the Japanese. By it Japan not only abandoned expansion in China, but was made one of several guarantors of Chinese integrity—for Anglo-Saxon economic imperialism. Under pressure from the other four powers the island empire was forced to scrap the old battleships and old armoured cruisers what would have been the spear-head of an attack on China and to abandon the 'eight-eight' programme.

The conference suggested no solution to Japan's population problem. It was not interested in that 'municipal' question. All the Japanese got was an undertaking on the part of the United States not to add to her Pacific navy bases and one from England not to fortify Hong Kong any further. No Japanese believed that the peace-minded Harding government had the slightest intention of building Pacific bases at any time, and every Japanese believed that England lacked the money to fortify Hong Kong.

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Thus in the eyes of the Japanese ruling class the whole business of the naval conference and the treaties it produced was an elaborately staged hoax with the purpose of preserving Anglo-American business interests in the Orient. Japan submitted to the pressures, but unwillingly and without a trace of that enthusiasm for peace, which however insincerely, was found among the other conferring nations.

In the meanwhile Japan's naval men consulted their slide rules and arrived at the conclusion that their nation could build up a force of light craft—cruisers, destroyers, submarines—that could render Anglo-Saxon interference in the Chinese venture so hazardous an undertaking that it would be impossible unless the full power of both fleets could be deployed at a moment when neither had any other distraction.

V

In the two years following the Washington Conference, the warships laid down by the conferring sea powers were:

TABLE I

	<i>Cruisers</i>	<i>Destroyers</i>	<i>Submarines</i>
United States . . .	0	0	0
England	1	0	0
France	3	3	8
Italy	2	11	2
Japan	7	15	11

In other words, Japan commenced construction on more warships than all the rest of the world put together.

II

HAIL TO THE PAPERCLAD

EXACTLY HALF THE total ships built by the Occidental powers were Italian. If the basis of comparison be changed from numbers to tonnage the Italian proportion shows up larger still; and the drive represented Italy's change from a fumbling parliamentary democracy into a military autocracy whose reason for existence seemed concentrated on the erasure of French contempt and the redemption of the last of Italia Irredenta.

—Contempt. When Orlando claimed his country's wages at the table of Versailles, old Clemenceau had snarled a refusal to yield Fiume or Djibouti, Dalmatia or control of the 50,000 Italians in Tunis—thereby teaching Italians how much treaties were worth. A certain out-at-elbows journalist from Milan learned of that contempt, and made it his profession. That Italy should bear the reproach of having sold out the Triple Alliance in 1915 was emotionally unpleasant, but not intolerable to a realist. That she should have sold out one set of allies and been cheated of the price by another was a demonstration of weakness.

Avanti, Savoia! The out-at-elbows journalist leaped to the centre of the stage, shaking his fist in the face of the world and shouting, 'Italy is an island in the sea of Rome—our sea!' and a hundred thousand robots cheered. 'We must render it impossible to challenge our primacy in this sea!'

The parity in navies France had granted at Washington was also an expression of contempt—a voiced conviction that Italy would not, could not, make it more than a form of words on paper. Any effort to turn the

form into a reality would meet French challenge. At Washington place and date had been set for that challenge—1927 and Geneva, when the conference was to be renewed, presumably to discuss the limitation on cruisers which had failed in 1922.

There was a chance that popular pressure would force the democracies into something like genuine disarmament at the Geneva gathering. If the precedent of Washington were to be followed—and diplomacy revolves on a pivot of precedents—the limits set by Geneva would be in terms of tonnage and the allotment to each nation would be in proportion to the ships afloat when the conference began.

If Italy were not to lose the parity with France Washington had given her, she must build spectacularly in the cruiser class before this new conference assembled. France had laid down three new light cruisers, fine strong ships of 7,500 tons each; Italy had only three little scouts of less than 3,000 tons apiece, built before the war. France had a numerous collection of old armoured cruisers, now proved useless for military purposes, but collectively of large tonnage, the basis of the almost unanswerable diplomatic argument—‘but of course we mean to replace them with new ships of the same total tonnage’. Italy had only four vessels of the type.

To establish a basis for a continued claim to parity, then, Italy must build rapidly ships of the cruiser class, of considerable tonnage, with a fighting power clearly superior to the new French light cruisers, yet of a type not readily comparable with the old French armoured cruisers.

II

At Washington the question of defining a cruiser in such a manner as to prevent the nations building battle-ships and calling them cruisers had arisen, of course. England, the country most deeply interested in the cruiser problem, wished to set the limits on unit size as low as possible for two reasons.

Limitation of every type was evidently going to take the form of regulating the total tonnage in a given class. The necessity of protecting her long overseas bread-line required her to divide her total cruiser tonnage into a large number of units—at least 50, said some of the English strategists, at least 70, said others. The size of the individual ship should, in the English view, be regulated by the total tonnage available in the class. If the total tonnage allotted to England were 500,000 she would have 50 cruisers of 10,000 tons each; if it were 50,000, she would still have 50 cruisers, but of 1,000 tons each.

But this necessity for a certain number of cruisers, regardless of size, applied to no other country. If the United States (for instance) were given 50,000 tons for cruiser work, she could put them into ten 5,000-ton ships which would eat up the British 1,000-tonners if it came to a clash. As a matter of historical record this was exactly what had happened in the War of 1812, an event of which English naval men cherished the most profoundly unpleasant memories. It was therefore, in England's view, important to limit the unit size as well as the total tonnage for cruisers.

And in a positive as well as a negative sense, it was important to England that the unit sizes and unit powers of cruisers be kept low. The comparatively light decks and slender bracing of a merchant ship will allow her

to carry nothing heavier than a 6-inch gun in time of war, and very few of these. Anything heavier would shake the ships to pieces by weight and recoil. Obviously, if England could write into the treaties a definition of 'cruiser' that would limit this type of ship to 6-inch guns and but few of these, the vessels of her merchant marine would give her a large potential reserve in the class. She could thus consent to reductions in the total tonnages allotted to warship-cruisers; indeed, she could press for such reductions.

But somebody in the British Admiralty blundered badly on this point at Washington. They insisted they would not give up any useful warship then afloat, and England made the definition liberal enough to permit her to keep the five *Effinghams*.

These ships had been designed, and two of them completed, during the war. They were intended to work along the scouting lines of the North Sea, where the fleets met, crippling German light cruisers and destroyers at the first contact, so that heavier ships could rush in and finish them off. For this purpose the *Effinghams* were built fast enough to run down their enemies—over thirty knots; they mounted guns that would drive a shell through German cruiser armour at the full limit of visibility—six 7.5-inch; and were protected against the guns carried by German cruisers—a 3-inch armour belt and a 3-inch deck. This combination of qualities evidently could not be obtained on a ship of ordinary cruiser size, but tonnage was not a factor of importance in wartime construction, and the Admiralty designers made no difficulties about giving their five *Effinghams* tonnages that would have been adequate to a battleship twenty-five years before—9,770 tons.

Accordingly the English delegates at Washington

wrote into the cruiser definition a provision that a cruiser was a ship of not over 10,000 tons, carrying guns not over eight-inch.

It was this definition that attracted the attention of Fascist Italy when she faced the problem of turning out ships that would give her a talking point in the parity argument with France. The Italians determined to build ships right up to the treaty limit—10,000 tons and 8-inch guns, with a speed greater than that of the three new French light cruisers.

It takes a long time to design a warship properly. (The German *Lützow* sank at Jutland because just one door was wrongly placed.) It takes two to four years, more to build one. Fortunately for the Italians they had on hand the designs for a series of big battleships, begun just before the war, and never finished—two turrets forward, each holding a pair of 15-inch guns, another pair of turrets aft, an anti-torpedo battery between, and a stout armour belt. If the big guns were reduced from 15-inch to 8-inch, the number remaining at eight; if the belt were cut from twelve inches of armour-plating to three; if the anti-torpedo guns were reduced to 3.9 inch and concentrated in paired mounts instead of distributed through a heavily armoured battery—the Italian constructors estimated that on a ship of practically the same size they would save enough weight to get enormous speed.

The cruisers *Trento* and *Trieste* were accordingly built on this plan; built rapidly, while designers in the other treaty nations were still studying out what could be accomplished under the restrictions. They were political ships, built less for fighting than for talking purposes—the first of the 'Treaty paperclads'. They had the speed—35 knots of speed—the armour and the guns all right,

but not much else. Ten years after their construction it was necessary to put them into dock for a refit which was practically a rebuilding.

III

While work on them was going forward, however, the explanation of jerry workmanship was only a charitable supposition. In view of Mussolini's announced intention of dominating the Mediterranean, it seemed imperative to both France and England that they provide reply-ships to the *Trentos*, which could knock out anything less than a battleship and run away from any battleship in either navy. French and English engineers had already studied the problem of putting 8-inch guns on a fast 10,000-ton ship, and had reached the conclusion that either armour or any speed over 30 knots would have to be sacrificed, since armour runs up tonnage hugely and those extra four or five knots add nearly 25 per cent to the weight of the engine installations.

They were still trying to work out a design for a rational ship when the building of the *Trentos* was announced. It forced their hands, and they built, a year after the Italian vessels, ships into which they put what they then knew. The two French *Tourvilles*, the seven British ships of the *Kent* class, were like the *Trentos* in possessing eight 8-inch guns in four turrets. Neither *Tourville* nor *Kent* came anywhere near the *Trento* in secondary armament—the French ships were given only eight 3-inch, the English six 4-inch, against the Italian's sixteen 3.9's. Both English and French ships were innocent of armour in the beginning, though when the *Kents* were finished they turned out to have saved enough weight to permit a thin little patch of plating to be fitted over the boilers.

In two other respects *Kent* and *Tourville* differed, and the differences were complementary. The French ships reached for and made 35 knots, but sacrificed their fuel capacity and hence their steaming radius to do it; the English kept the long steaming radius and dropped speed to 32 knots. Yet the *Trentos* had both radius and speed, as well as armour. In fact, if the three types were ranked as to their various characteristics the comparison came out like this:

TABLE II
THE EUROPEAN TREATY PAPERCLADS

	Main guns	Secondary guns	Speed	Radius	Belt Armour	Deck Armour	Torpedo Tubes
<i>Trento</i>	1	1	1	1	1	1	1
<i>Tourville</i>	1	2	2	3	3	3	2
<i>Kent</i>	1	3	3	1	2	1	3

How had the Italians done it? The answer British and French naval architects found was that they had not—that the Italians had written the figure 10,000 tons down on a sheet of paper and then built the ships they wanted. To the mistress of the seas this was comparatively unimportant. She had seven of the new ships, could put 56 guns in line to the Italian 16. But the franc was suffering dreadful sinking spells, the French Army was expensive, and the French Chambers seemed to feel that money spent on competitive warships construction was money thrown in the ocean. France therefore went to the 1927 conference in a mood of angry suspicion; and Italy complemented it with a mood of self-satisfied obstinacy, the former determined not to concede a parity which she felt the latter had reached only by a cheating trick.

IV

Meanwhile, events beyond the Atlantic were producing another series of cruisers and another of irritations. Of the seven cruisers Japan had laid down during the first two years of the navy treaty's life three were light vessels, mounting nothing heavier than a 6-inch gun. The other four, the four *Kakos*, were supplied with six each of the new 8-inch pieces, an armament that made them more than a match for any cruisers in the American Navy. This caused much worry to those American naval officers who regarded Japan as their logical opponent, since the American Navy was peculiarly weak in cruisers, and her battleships, slower than those of any other nation, were peculiarly ill-fitted to deal with cruisers.

These officers found little support either in the country or in Congress. The Washington Treaty publicity had been extraordinarily successful in convincing Americans that a day of universal disarmament was at hand; it was December of 1924 before an authorization could be obtained to build the first ships since the war—a pair of the new Treaty cruisers. But the same Congress that authorized these ships had taken up the immigration laws, and its committee had favourably reported a Bill revising the permitted quota of Japanese immigrants sharply downward.

The Japanese ambassador was indiscreet enough to make a public statement (at least it reached the Press) that 'grave consequences' would follow the passage of the Bill. Naturally there was an explosion of Congressional annoyance, and a still more drastic exclusion law was passed, phrased in such terms as to imply that the Japanese were almost sub-human. At the same time the American fleet cruised to Australia, where it was

enthusiastically received, and by a coincidence of time this was the moment when the Press on both sides of the Pacific began to talk about the characteristics of the new American treaty cruisers—as yet unauthorized.

Foreigners note our tendency to boast of the bigger and better things we are going to do in the future as one of the most distinctively American characteristics. In this case some knowledge of the European treaty cruisers was combined with the idea that Americans are superior in everything and a considerable dose of imagination to produce a rumour that the new U.S. ships would have great speed, good armour, and a battery of twelve 8-inch guns.

Japanese engineers, like the others, had put their slide-rules to work on the problem of the 10,000-ton cruiser. They knew perfectly well that it was impossible to get twelve such guns on a 10,000-tonner, and would have paid no attention to the rumours but for the coincidences of the Australian cruise and the exclusion laws. But these events made everything clear to the proud, sensitive, suspicious Orientals, already more than half convinced that the whole business of the Washington Conference had been a kind of anti-Japanese plot in behalf of Anglo-Saxon business interests. The deduction they drew was that the stories about American twelve-gun cruisers were perfectly true; that the United States was doing what France accused the Italians of doing—building ships of one size and calling them another.

Japan therefore prepared for the conference in a mood of black anger, and in the meanwhile laid down the four *Natis* as replies to the (supposed) American vessels.

If the *Trentos* were remarkable examples of weight saving, the *Natis* are more remarkable still. They have as much armour as the Italian ships, nearly as much

speed, nearly twice as much cruising range, as many torpedo tubes, more aircraft. In addition, they have an extra gun-turret, mounting two additional 8-inch guns, a total of ten; an extremely weighty installation when the extra internal bracing, handling rooms, and machinery are considered. The two American ships, the *Pensacolas*, finished shortly after, also had ten guns, but they obtained this increase in armament by installing an extra gun in each of two of their four turrets. This is an arrangement which gunnery officers dislike very much; it makes ragged salvos and difficult fire control, and had already been rejected by French and British for that reason. Moreover, the *Pensacolas* had sacrificed armour, speed, torpedo tubes, and secondary armament, and had saved a great deal of weight by welding processes which the Japanese as yet had not dared to attempt.

In other words, if the 'Treaty Paperclads' of the five conferring nations are ranked according to their various characteristics, the comparison comes out like this:

TABLE III
THE TREATY PAPERCLADS

	Main guns	Secondary guns	Speed	Cruising Range	Belt Armour	Deck Armour	Aero- planes	Torpedo Tubes
<i>Trento</i>	3	1	1	3	1	1	5	1
<i>Tourville</i>	3	3	2	5	5	4	3	3
<i>Kent</i>	3	5	5	3	4	1	3	4
<i>Nati</i>	1	2	3	1	1	1	1	1
<i>Pensacola</i>	2	4	4	2	3	5	1	5

Of these factors the greatest weight-eaters are main guns, speed, and armour. The Japanese and Italian ships were superior in all. How had they done it? The Japanese said by cutting down crew accommodations to

Oriental standards; but many American naval men have still to be convinced, and very few were convinced when the Geneva Conference opened.

v

There was plenty of material here to make that conference the disastrous failure it turned out to be; but in addition the British Admiralty supplied it with another reason for breaking down. They had seven of the new big cruisers afloat; nobody else but the Japanese had more than two, and England felt that in view of her own paramount interest in the cruiser question the other nations should be willing to join her in calling a halt on the construction of large cruisers, thereby fixing the totals for each nation at the figures then attained.

The meaning of this was that the British had been working out the tactical and strategic qualities of the new ships. They had realized that continued construction of the 10,000-tonners would stabilize the cruiser type around the 8-inch gun ship, a long way from the smaller 6-inch gun vessel against which the numerous English armed liners might put up an argument in a war.

The Italians, who had gained their talking point, naturally agreed; the French, who were watching the Italians, said nothing. Japan, which would be left with eight of the new vessels against two American, more than agreed; she blandly offered the suggestion that battle-ships should now be scrapped altogether and all over the world, and future warships be limited to 6,000 tons and 6-inch guns. This arrangement had the pleasing feature that its adoption would leave Japan's navy superior even to England's, with the United States a bad fourth, behind France.

Naturally, both proposals were totally unacceptable

to the Americans, and not alone because they would leave Japan in a position of superiority. The small cruiser might be ideal for the empire which never looks on a setting sun, for no English ship need ever be more than eight hundred miles from a base. But American warships must operate in one of two gigantic oceans. American cruisers, by definition ships that must contemplate operations at long distances from home, must be prepared to steam several thousand miles without refuelling. This meant that fuel capacity was a necessity for American ships, and this in turn meant big ships.

In other words, American strategists had also worked out the implications of the 10,000-ton 8-inch gun cruiser, and had come to the realization that in drawing the definition, England had provided an instrument ideally suited to American needs. When the proposal to limit cruisers to smaller tonnages and 6-inch guns came up, the Americans indignantly rejected it. As this was the only type of limitation in which the other nations were really interested, it afforded them an ideal opportunity for breaking up the conference and laying the blame on Uncle Shylock.

They did; and naval constructors throughout the world now took up the problem of the 10,000-ton cruiser from a strategic and tactical, instead of a political standpoint.

III

TINCLADS AND TOY BULLDOGS

AS THE DESIGNERS began reshaping the first series of treaty cruisers to take the 'bugs' out of them, and to play position for the next limitation conference, which was scheduled for London and 1930, armour was the want most universally felt. Warships will normally be called upon to fight vessels of approximately their own type, and it needed neither test nor calculation to prove that the exiguous plates of the paperclads would afford about as much protection as a dancer's bubble to the gusts of 8-inch shell that would beat against them in battle.

In nearly all the treaty countries, therefore, the heavy cruisers of the second series sacrificed a knot or two of speed and put the weight thus gained into protection. These ships were the 'treaty tinclads'. Their armour was still inadequate at any reasonable battle range, their speeds were still comparable with those of destroyers, the ships as a whole were still regarded by conservative naval men as delicate pieces of bric-à-brac for diplomats to play with, but at least they were designed with military requirements in mind.

There was one exception to the general rule. The English ships of the second series were paperclads still—perhaps because the conservative habit of that interesting race causes them to insist that whatever they have is best until the contrary proposition can no longer be disputed, perhaps because the heavy cruiser as a general type is so foreign to British naval habits of thought that no British designer could work at his best in the form. Whatever the reason the cruisers of the *London* class practically duplicated the seven *Kents* that had preceded

them. They differed only in having one knot more speed and better anti-torpedo subdivision, improvements which used up so much weight that the Admiralty could not even give them the patchwork armour the earlier ships received.

There were to have been two more *Londons*, but by time the date arrived for laying them down, the Admiralty had reached the conclusion that the heavy cruiser was thoroughly unsatisfactory for British purposes—too big, too expensive in first cost, maintenance and crew for proper cruiser duties; too weak in armour and gun-power to work as a fast wing of the battle-fleet. They cancelled the last two ships of the class and made one final effort to produce an 8-inch gun ship that would embody British fleet policies. The tonnage was dropped to 8,250, the big guns to six, the speed to that of the *Kent* class, and the patch of armour reappeared amidships.

The result was the two *Yorks*; while they were building the Admiralty hopefully but sceptically halted any other cruiser construction. But the savings in cost and maintenance turned out to be negligible, in crew practically nil, and it was evident even before the new ships were launched that they would only be inferior *Kents*. The Admiralty abandoned the whole question, laid down a series of 6-inch-gun light cruisers and turned over to English diplomats the problem of seeing to it that no other nation built anything that would outdo them.

Like the British, French sailors let out a howl about inadequate protection when their paperclads joined the fleet. But strategy requires them to work in the narrow waters of the Mediterranean, where the torpedo is always a menace; even more than more armour they wanted better safeguards against these trainloads of dynamite. French designers responded with the four *Suffrens*, in

which two knots—those last, costliest two knots—were dropped from the speed in favour of an elaborate system of underwater subdivision and a series of bulkheads right up to the main deck, designed to localize the effect of torpedo explosions. There was an armour belt, too, but thin—less than two and a half inches, that is, less than that around the *Trentos*.

The American paperclads, just as foreign officers had predicted, proved bad gunnery ships, but for the wrong reason. The pair of three-gun turrets high up made them roll badly, and their low freeboard made them wet forward in rough weather. But they turned out nearly a thousand tons under the treaty limit, which gave American designers a good margin to work with on the tinclad series, the six *Chesters*, that followed. Still more weight was gained by entirely suppressing one turret with its heavy barbette and handling machinery, supplying the new ships with nine guns in three three-gun turrets, two forward and one aft. With these gains it was possible to step up speed a knot over the *Pensacolas*, build in considerably more underwater protection, and improve the arrangements for handling aeroplanes. They were shortly followed by two more tinclads, the *Portlands*, in which part of the belt and a knot of speed were taken off to give better deck protection against aeroplane bombs and plunging gunfire from long ranges.

These complete the list of the tinclads, the first true warships in the new 10,000-ton class, the first real experiments in the medium. The Japanese *Natis* really belong in this class, or even among the third series of heavy cruisers, rather than with the paperclads, the rising-sun kingdom having gained the jump on the world by doing her experimenting on the *Kakos* during the two-year holiday after the Washington Treaty. Italy did her

tinclad experimenting with other people's money, building a pair of cruisers not unlike the British *Yorks* for the Argentine; like England, decided the type was not a good one and dropped it.

II

All the paperclads and tinclads had some glaring defect. The Italian vessels were wretchedly weak in construction, the French badly armoured, the British likewise, the Japanese short on stability and weakly protected against torpedoes, the American ships bad rollers and not very strong. (One of the *Chesters*, *Chicago*, was cut right down to the waterline in a collision with a freighter, and five of the first six tinclads cracked their weight-saving one-piece cast sternposts.)

Basically, the trouble with these ships was that naval architects had never before been faced with the problems involved in designing ships that had to come within absolutely rigid limits. Normally a naval general staff told them what characteristics it wanted in a warship and they designed the cheapest possible vessel (in terms both of tonnage and money) that would fulfil the requirements. In the case of the cruisers they were given limits in tonnage and money and asked to get the utmost possible in military characteristics out of it.

What military characteristics? It was up to the naval architects, who were primarily engineers, not seamen, and it is hardly surprising that seamen found much in their achievement to criticize. Or put it another way—naval architects had never before been required to come seriously to grips with the question of saving weights, not in one part of a ship, but in all. It required a good deal of scientific experimentation in designing more efficient hull forms, engines that would give the same

power yield for less mass, the use of aluminium alloys, and the replacement of rivets by welding, to work out the weight matter satisfactorily.

The political need to get paperclads and tinclads afloat forced their construction before these experiments were complete. While they were building, the process of experiment was carried on in smaller, less expensive fleet units, particularly gunboats, but the harvest of these experiments was not gathered till the appearance of the third and final series of heavy cruisers, by which time England had retired from the competition.

The Japanese ships of this last series were the four *Atagos*—*Nati* revised, with a 4-inch armour belt that would stop 8-inch shell at extreme battle ranges, better deck protection, better torpedo protection, and a better anti-aircraft battery. Italy produced the four *Zaras*, dropping speed two knots from the *Trento*, increasing belt armour to 5.5 inches, which would keep out an 8-inch shell at reasonable battle ranges; and, lastly, turned out a single vessel, *Bolzano*, with an inch less armour than *Zara*, but three knots more speed, the most speed any treaty cruiser attained. France built one remarkable ship, *Algérie*, intended to be the first of a class of seven, fast as the *Zaras*, much more heavily plated, better protected against torpedoes. The eight *Astorias* were the American contribution; they have 5-inch belts and 6-inch turrets, deck armour like that of a battleship, and the nine big guns that had become classic in American heavy cruiser design.

The table, which at first seems a jumble of figures, furnishes a good deal of information on analysis. It shows why the *Effingham*s, with which the whole heavy cruiser business started, were by 1938 considered no longer of any value in that class and were rebuilt into

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light cruisers with 6-inch guns, convoy specialists. It shows the Japanese and Italian ships no longer first in everything, and suggests the possibility that these nations were not cheating when they built the ships that aroused so much indignation, but had rather been better designers who more quickly learned how to save weights. Most important of all, it shows all the nations starting with a pretty much generalized type in the paperclads and evolving along the lines of national naval strategy in later ships.

The ranking of all the heavy cruisers works out:

TABLE IV
HEAVY CRUISERS

	Main Guns	Secondary Guns	Speed	Cruising Radius	Belt Armour	Deck Armour	Torpedo Protection	Aeroplanes	Torpedo Tubes
<i>Pre-treaty Ships</i>									
<i>Effingham</i> (3 ships) ¹ (England)	17	17	17	16	5	17	12	17	8
<i>Paperclads</i>									
<i>Kent</i> (7 ships) (England)	7	16	12	8	12	11	9	14	2
<i>London</i> (6 ships) (England)	7	8	12	8	16	5	1	14	2
<i>Tourville</i> (2 ships) (France)	7	15	2	13	17	5	12	8	8
<i>Trento</i> (2 ships) ² (Italy)	7	1	2	11	5	15	12	8	13

¹ Note to table.—One of the *Effinghams* had been lost at sea and another converted into a school ship.

² Note 2.—*Trento* is treated as of the date of her refit.

HEAVY CRUISERS

(Continued)

	Main Guns	Secondary Guns	Speed	Cruising Radius	Belt Armour	Deck Armour	Torpedo Protection	Aeroplanes	Torpedo Tubes
<i>Paperclads</i>									
<i>Pensacola</i> (2 ships) (U.S.)	3	11	10	6	14	11	12	1	14
<i>Kako</i> (4 ships) (Japan)	15	11	4	7	13	16	12	8	1
<i>Tinclads</i>									
<i>York</i> (2 ships) (England)	15	8	12	8	10	5	1	14	8
<i>Suffren</i> (4 ships) (France)	7	10	4	13	14	4	1	8	8
<i>Chester</i> (6 ships) (U.S.)	4	11	15	1	10	5	9	1	14
<i>Portland</i> (2 ships) (U.S.)	4	4	15	1	9	2	1	1	14
<i>Nati</i> (4 ships) (Japan)	1	7	4	1	5	5	12	1	8
<i>True heavy cruisers</i>									
<i>Algérie</i> (1 ship) (France)	7	6	4	13	2	3	1	7	8
<i>Zara</i> (4 ships) (Italy)	7	6	4	13	1	11	1	8	8
<i>Bolzano</i> (1 ship) (Italy)	7	1	1	12	5	11	1	8	2
<i>Atago</i> (4 ships) (Japan)	1	14	4	1	4	5	9	1	2
<i>Astoria</i> (8 ships) (U.S.)	4	4	10	1	2	1	1	1	14

Note how the French and Italian cruisers rank low in the scale as to cruising range; only the *Effingham*s, originally intended for North Sea work, rank lower. The indication is clearly that both French and Italian ships are intended to operate at no great distance from bases. Their high speeds, the highest in the list, mark them as raiders and raider-punishers. Yet there is one striking difference between the two types. The Italian ships carry few aeroplanes, relatively light armour guards them from bombing attack, but they have enormous anti-aircraft batteries. The French ships all have good deck protection, their anti-aircraft batteries are among the weakest of the class, but they carry numerous aeroplanes of their own. Now if this means anything it means that the Italian strategists count on using their heavy cruisers as the centre of swift striking forces, on missions where they can be accompanied by shore-based aeroplanes; where they are expected to encounter relatively weak enemy aerial units which can be taken care of by the ships' guns. On the other hand the *Tourvilles*, *Suffrens*, *Algérie* would seem designed to stand up under a good deal of aerial bombing and to go on the kind of mission where they must furnish their own air escort. In other words, the Italian ships are the raiders; the French are defenders.

The American and Japanese ships line up so totally different as hardly to be comparable. Both have enormous cruising ranges, great striking power, strong armour, a large number of aeroplanes. They would seem intended to make long runs and at the end of these long runs to fight out battles with the gun.

But here also important differences crop up between the two national types. The Japanese heavy cruisers are the most feebly protected against both the torpedo and

the aeroplane of any on the list, but are themselves plentifully supplied with both weapons. They would find their ideal operating point where they could use both weapons, but where neither would be a menace to them; that is, they are blue-water raiders, to operate lonely or in small squadrons against extended commerce lines.

The American heavies present exactly the opposite case. Their elaborate torpedo protection, the thick double decks against bombing attack, argues an intention to use them where torpedoes and bombs are thickest. Their own lack of torpedo tubes indicates employment in accompaniment with other ships that will act as torpedo carriers, and with the number of aeroplanes they carry identifies the place where they will be employed as the extreme scouting line of a battle-fleet, where contact would be made with enemy light forces in the midst of a wide ocean.

The English types are not specialized for any field of action, but represent about as good a compromise as could be achieved among the qualities sought elsewhere. And in this compromise, in England's failure to make the cruiser definition of the treaties tight enough to prevent the building of 'restricted geography' warships, lies the secret of her effort to force the abolition of the heavy cruiser in 1927 and 1930. England's Navy is the richest in the world; can afford to build ships for special tactical purposes, such as anti-aircraft vessels or net-layers. But there is one type of ship it cannot afford—the ship that operates at maximum efficiency only in one geographical region, for the spread of English interests demands her ships must be able to fight equally well in the Mediterranean or off the coasts of China. The heavy cruiser had now evolved into this type of ship; but

fortunately for England there were now good stratego-political reasons why all the other nations but the United States were willing to join in its abolition.

III

The treaty-makers at Washington were so exercised over the possibility of some power building battleships and calling them cruisers that it never occurred to them that any one might build cruisers and call them battleships. Yet the Versailles Treaty might have been drawn especially to bring about the latter result. Its naval clauses permitted Germany to keep six battleships, which were limited to something less than a tenth of the power of those then current elsewhere—that is, to 10,000 tons and guns not larger than 11-inch. The provision was intended to make the German Navy just formidable enough to keep the Bolsheviks quiet in the Baltic, by allowing them to retain a half-dozen old pre-Dreadnoughts, of which the most modern was completed in 1907.

The Versailles treaty-makers assumed that when these vessels died of old age the Germans would replace them with ships of similar type, accepting permanent inferiority to the French and British fleets, a presumption which showed ignorance of Teutonic psychology. The treaty did not allow work to begin on the replacement of the first of these old crocks until 1928, the year of the tinclads, also a date remote enough from Versailles to allow the Germans to make the careful experiments and calculations that had been denied to the builders of the first heavy cruisers. The very fact that they could build nothing before this date was an advantage; the annual naval appropriations went into research or were laid

aside, and when the new battleships were actually begun they could be built out of an 'expense no object' budget.

The result was *Deutschland*, the first of the famous 'pocket battleships', a vessel certainly not fitted to lie in the line of battle against French and English dreadnoughts, but as certainly not intended for any such purpose. She was given 26 knots, a speed that would keep her out of range of any battleship afloat; six 11-inch guns, which would shoot well beyond the range of any 8-inch gun cruiser, in a single broadside throwing more than double the weight and double the explosive power of any ship of that class; an armour belt equal to any on a treaty cruiser; a huge armament of anti-aircraft guns; and Diesel engines, which would give her cruising range enough to take her round the world.

In other words, a fleet of these ships could not prevent Germany being blockaded as she had been blockaded during the war. But it could make war extremely costly to any other power. *Deutschland* was a commerce-raider; once loose on the sea lanes, she could keep going practically for ever, living off her prizes. Merchant shipping would have to go in convoys with at least a battleship to protect each convoy if such a raider were on the seas, for the German was also a cruiser-killer; and there were not in the world enough battleships to guard the convoys of England under such conditions.

Or more especially, the convoys of France. England had three battle-cruisers (*Repulse*, *Renown*, *Hood*) that could both catch *Deutschland* and shoot it out with her once she was caught. But France had nothing. For her the laying down of *Deutschland* meant that her heavy cruisers would be thenceforth useless outside the Mediterranean. When the preliminary talks before the London

Conference began—those important preliminary talks in which everything is really settled—the French had laid down *Algérie* as the first of a class of seven. They were now predisposed to contribute to limitation by foregoing the construction of the other six.

Italy had turned her paper parity with France into a reality in the heavy cruiser class, and her naval strategists were busy with a system of ideas in which the expensive heavy cruiser played but little part. She was even eager to see a 6-inch gun limit go into effect. By quick building Japan had brought her cruiser tonnage far above the 3 : 5 ratio to the American fleet which had been accorded her in battleships at Washington. Over a long pull the better American industrial plant would beat her out again; therefore she too was willing to fight for any restriction that would halt heavy cruiser building where it then stood.

The London Limitation Conference, otherwise a maze of clashing personalities, politics played to home galleries, and international double-crossing, thus boiled down to a four-power effort to limit heavy cruiser construction in the United States. An intricate compromise achieved this object at the price of allowing America to lay down one heavy cruiser per year for the three years following the building of the first five *Astorias*, then in the keel stage. The conference gave the Japanese fleet parity in submarines with England and the United States, provided for the scrapping of five British, four American, and one Japanese capital ships already in the last stages of senile decay, and then went home without having limited anything else.

France and Italy refused to sign even the spineless treaty that came out of the meeting, but Italy was playing copycat to France and France already had no further

use for the 8-inch gun cruiser. She cancelled the remainder of her programme without any treaty, and took up the question of building something that would knock out the *Deutschlands*, of which Germany evidently intended to build several.



IV

THE BATTLESHIP COMES BACK: •

THE NEW FRENCH NAVY

IN THE MEANWHILE, some research, some thinking, and a good deal of information not available in 1922 showed that the battleship was not as much of a dodo as she looked to the perpetrators of the Washington treaties. They had known that the blockade was a powerful influence in determining the result of the World War; but it was only after the conference, on information from Germany, that the blockade was perceived as the factor of overmastering importance. Battleships thus won the war. Merely by swinging at anchor in Scapa Flow and looking grim they won it, while Germany starved for rubber, copper, and flour. They did not have to fight. The investment in all those non-battling battleships was huge, but it was only an insignificant fraction of the money spent on the land armies that had struggled to futile deadlock from the North Sea to the Aegean.

When the battleship did fight she was by no means as vulnerable as had been supposed. Investigation showed that the three British ships of the line blown up at Jutland had all suffered the same semi-accidental casualty. A shell penetrated a turret and exploding inside, set off a charge of powder waiting to be loaded; the flash ran down the ammunition hoist to a magazine and up went the ship. The means of preventing such explosions were known to the Germans. In the same battle of Jutland, their *Seydlitz* had three turrets similarly penetrated, their *Derfflinger* two, and their *Lützow* at least one, without any magazine explosions. When the German ships were surrendered at the close of the war, the rest of the world

had been given opportunity to study and copy German safety methods. It was in the last degree unlikely that flash would ever again destroy a big ship.

Moreover, all the penetrations, both on the English and the German sides, had occurred aboard battle-cruisers—that is, battleships in which armour had been sacrificed to speed. A big shell hit a turret on one of the true battleships from relatively short range; nothing happened but some slight disturbance among the electrical connections of the turret.

Detailed study showed, indeed, that really heavy armour in every case proved far more valuable than any proving-ground tests indicated it would, perhaps because shells seldom fell on the rapidly moving ships from the angles that would make penetration easy. And when shells did get through armour, the first-class battleships showed a power of resistance far beyond the most sanguine expectation. ‘Egg-shells pounding each other with hammers’, Winston Churchill had called battleships before the war; from the data of Tsushima in the Russo-Japanese War, it had been supposed that twelve to fifteen penetrations by heavy shell would reduce any battleship to sinking condition, and a single torpedo would finish her. But at Jutland British *Marlborough* was caught squarely in the most dangerous spot by a torpedo; never had to leave her place in the fast-moving line of battle or missed firing a single salvo. British *Warspite*, German *Derfflinger* were hit by nearly twenty heavy shells apiece and went on fighting. German *Seydlitz* was shot through by more than twenty heavy shells plus at least two torpedoes, but swam back to port in safety.

Nor was this all. During the night after the battle, as the German warships ploughed lightless for home, the battleships separated from their supposedly indispensable

destroyers, with many ships seriously wounded during the afternoon's fighting, they encountered British torpedo flotillas. The conditions were supposedly ideal for 'the latter—night, hurry, damaged ships, no protective screen. What happened? The Germans lost one old pre-dreadnought, one light cruiser. Not a battleship was touched, but the destroyers that attacked them suffered heavily. 'The outstanding fact of Jutland was the ability of battleships to protect *themselves* from torpedo attack under all circumstances', said one of the best analysts.

It also appeared that there was a large amount of phoney about the menace from the air. As a kind of curtain-raiser to the Washington Conference, the surrendered German battleship *Ostfriesland* had been taken down to the Virginia Capes and sunk by bombs from U.S. army aeroplanes. Time brought a footnote to this performance; already before the bombing *Ostfriesland* was leaking so badly as to have many tons of water on board, and the army aviators had swooped near enough almost to be able to spit on her decks, which they never could do in war. Besides, she was an old ship; when, after the conference, the aviators were given their chance at a new one, the unfinished battleship *Washington*, they banged away at her for several days without being able to sink her at all. The battle-fleet had to be called in to finish the job with big guns; and even they had to close in to ranges shorter than any in World War experience.

In the years after Washington the aeroplane had developed indeed, but at nowhere near the speed predicted by its admirers. By the time the first pocket battleship was launched it was clear that the era of startling inventions was over; further development would come along the slow path of perfecting details. It was anti-aircraft gunnery that was improving along a curve

that threatened to become a vertical, as the war in Spain was soon to demonstrate.

Experiment and analysis of battle results thus alike showed that the battleship was a much tougher citizen than she had been imagined to be. Instead of being under a law of diminishing return as to size, her powers of resistance increased in geometrical proportion while the size only climbed by arithmetic.

Yet the charge of frailty was the most serious of all those brought against the battleship—the only one that really carried weight. For of all warships the battleship yielded the greatest fighting power per dollar, both of original cost and maintenance charges. Approximately five light cruisers could be bought for the price of a single ship of the line; but it would take twice as many men, four times as much fuel to run the five cruisers, and they would not last an hour against a battleship in a fight. Eleven or twelve destroyers could be had for the same money; they would take 2,400 men to the battleship's 1,500, their operating cost would be at least twice as heavy, and their delicate mechanisms would run down ten years before the big ship wore out.

In short the battleship had again become a good investment by 1932.

II

When Germany announced the laying down of a second *Deutschland* the obvious French reply, then, was to build battleships. With reference to her position under the treaties France could easily do this. One of the dreadnoughts she had been entitled to retain under the Washington agreements had been lost by shipwreck. It was allowable for her to replace this ship and also three old pre-dreadnoughts, now well past the age limit. This

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gave the French a reserve of something like 70,000 treaty tons in the battleship class, enough to permit her to build two first-class ships, each at the treaty tonnage limit of 35,000.

But for two reasons, one tactical, the other political, France was extremely loath to do this. Her naval men had to think not only in terms of Germany, but also in terms of Italy. A Franco-Italian agreement was in process of negotiation, under which both parties would build no capital ship of a tonnage above 25,000—or perhaps 23,333. Whether France already had such an agreement with England or not is still something of a moot point. It has been supposed that she had. The evidence in favour of the supposition is supplied by (1) the secret Franco-British naval treaty stolen or bought by one of the Hearst employees, which dealt with other matters, but indicated extremely close co-operation between the two navies; (2) the fact that when England and Germany signed a bilateral naval treaty in 1935, it bound the latter country to small battleships; (3) the fact that France acted as a unit with England in trying to force the small battleship down the neck of the United States in 1927, in 1930, 1932, and finally in 1936.

As in the case of cruisers this question of unit size was the basis of serious Anglo-American disagreement. Throughout the conference period England persistently sought to make the standard battleship as small as possible, while keeping the total tonnage for the class as high as possible. Her bases circle the world. If battleships could be restricted to a small size hers would always be best; for alone among nations, she could afford to cut down on the fuel capacity of ships to obtain other qualities.

(The case is slightly different than with vessels in the

cruiser class, which must always be prepared to keep the sea for long periods, unless intended for service in such special areas as the Mediterranean or the Baltic.)

Small battleships also meant greater flexibility for the British Navy. With many ships of a limited size it could work up in any given locality a concentration equal to the task in hand without wasting power. Finally, small battleships meant that in a building race England could outdo any rival. Her building yards are the most numerous in the world. An artificial limit on battleship sizes would both keep competition in numbers within the limits of her financial capacity, and ensure that no nation could seize from her the primacy of the seas, as the United States had threatened to do in 1919-22, by building a few ships of such gigantic mould as heavily to overmatch English vessels.

As long ago as 1921 British naval men had worked out 25,000 tons as the optimum size, though they felt that if necessary they could get all they wanted out of a 23,333-ton warship. Japan, with her chain of bases surrounding the Yellow Sea and stretching down the China coast through Formosa, and out into the Pacific among the mandated islands, wanted the same size in battleships for the same reason.

But for exactly the converse propositions, the small battleship was unacceptable to the United States. No imaginable 25,000-tonner could make the long haul from Hawaii to Manila and off the latter port fight on equal terms for a ship that need carry fuel for only a third of such a run. But a 35,000-ton ship would be under no such disadvantage as against an enemy 35,000-tonner; for it would take hardly any more fuel to send her across the Pacific than her smaller sister. U.S.S. *Arkansas*, for example, requires 5,000 tons of oil to drive

her 26,000 tons for 8,000 miles; U.S.S. *Colorado* (admittedly a later ship) needs only 4,000 tons of fuel to drive 30,000 tons of ship for 10,000 miles.

The American Navy had been forced to yield point after point in the cruiser controversy, making some gains at every concession; that is, getting some ships of the size it wanted. But as the World Disarmament Conference of the League of Nations of 1932 approached, the Americans were still immovable on the battleship question. Yet on this point England also wished no compromise. When battleship building began again in 1936, she wished to build small ships; could not bear to see another nation in possession of larger ones. Therefore the English prepared to mobilize against American obstinacy the force of world public opinion, to which the American Navy is peculiarly sensitive through Congress and a considerable pacifist Press.

That is, if no other nation built ships larger than 25,000 tons (or 23,333) it would be extremely difficult for the United States to go beyond this limit. At the time when it became necessary for France to build against the *Deutschlands*, she was striving to reach agreement with Italy on a number of points, of which naval building was only one. British support was a necessity to her. If these anti-*Deutschlands* were 35,000-tonners English support would not be forthcoming.

On the other hand, if France built in the smaller size and the agreement with Italy should fall through, Italy would be at liberty to build big battleships, thoroughly outclassing the French vessels. It was not the first time that the French Navy had been placed in a cruel dilemma through being forced to adjust its needs to those of the army and diplomatic corps.

III

On the heels of the Franco-Prussian War, President Thiers declared, 'The navy is an arm of luxury for France. *What use is a battle-fleet against the Germans?' In fact, a battle-fleet of great strength had proved no use whatever in the disastrous conflict then just ended; and in response to this failure a new system of naval thought grew up in France. Its leaders were called the *Jeune Ecole*; their purpose was expressed in the famous Lamy report of 1876—'to renounce war made by fleets of armoured vessels, so expensive, of such uncertain value' in favour of the fast raiding cruiser supported along home coasts by the torpedo and the mine.

The debate between the *Jeune Ecole* and its critics spread to the public and convulsed France for twenty years, or until the Spanish-American War. That conflict was, in a sense, a test for *Jeune Ecole* doctrine; for the Spanish Navy had accepted the French theory; its ships had been built and its men trained under Gallic supervision. The Spaniards went down to crushing defeat before the big-gun-on-big-ship theories of Mahan, and the Russo-Japanese War, in which *Jeune Ecole* opinion was again heavily engaged on the losing side, confirmed the verdict.

Yet her navy remained for France something of an arm of luxury, the least indispensable link in her chain of national defence, the department which suffered first in moments of financial stringency. *Jeune Ecole* doctrine had at least the merit of outlining a possible method of operations for a cheap fleet. Above all it was suited to the ardent, individualistic French temperament; for it emphasized the use of the torpedo, which more than any

other naval weapon demands intelligence married to extreme coolness in moments of danger.

The torpedo doctrine thus emotionally, if not intellectually, became a part of French naval tradition. And this matter of tradition is particularly important in naval warfare, where events occur with such rapidity that tradition, indoctrination, constitute not so much thoughts in themselves as part of the mechanism by which thought is achieved. French naval theorists—Daveluy, Castex—might write in support and extension of the battle-fleet principles enunciated by Mahan. French naval manoeuvres might be planned in accordance with those principles. But in directing specific actions, even in the use to which naval appropriations are put, the principles of Mahan are often less influential than those of the *Jeune Ecole*.

The 1919 reaction against the battleship was nowhere so violent as in France; the evidence that the last battleship action had been fought nowhere seemed so irrefutable. All the sea powers stopped work on battleships after the Washington Conference; but even before that gathering took place France had abandoned construction on no less than nine keels, as many as England and the United States together. The result of the conference seemed to confirm French opinion that the battleship was dead.

But if the battleship were dead, the naval war of the future belonged to the light, fast ship and its auxiliaries below the surface of the sea and in the air above it. The naval limitation treaties thus marked for France the renaissance and triumph of the *Jeune Ecole*—a *Jeune Ecole* which now accepted the strategic doctrine that command of the sea must be achieved as a prelude to any effective naval action, but which now interpreted its traditional

doctrines into tactical methods for achieving command of the sea. They looked on the naval battle of the future not as a ding-dong tussle between two long lines of armoured giants pounding each other with heavy guns, but as a bewildering fantasia of ships plunging in and out of smoke, fog and night at forty miles an hour with aeroplanes rocketing from the skies and submarines rising from the depths.

In such a battle torpedo and aerial bomb would be at least as important as the gun; armour would be nearly useless; ship-crippling accidents would be continuous, and if one of these happened to a big ship, it would deduct a heavy percentage of a fleet's total force. The large unit was also a large target, difficult to move at the speeds demanded by the French speed tactics. She could be useful only as a threat, to confine the heavy ships of an enemy behind the breakwaters of his own harbours.

The actual fighting in such a war would be done by light vessels, led and supported by a few cruisers, with numerous submarines to scout for them and lay traps for raiders. These light ships should be cheap; fast enough to dodge aircraft; large enough to carry many torpedoes—large enough to survive a couple of salvoes from a light cruiser. They should mount a gun that would fire with great speed a shell heavy enough to hurt a light cruiser or to knock out a small Italian destroyer or torpedo boat in a few discharges.

Parenthetically, this gun requirement was for the biggest possible cannon that would take chambered ammunition—ammunition which includes both shell and propelling charge in a single metal cartridge case and thus requires only a single operation in loading. In the early 'twenties this was the 13 centimetre, or 5·1-inch gun; later a 5·5 was developed.

The total result was a series of gigantic destroyers, in size and tonnage about equal to the small cruiser of 1900. They are the most typical ships of the French Navy and the general difficulty in properly pigeon-holing them is expressed in the fact that they are called by Italians *exploratori*—explorers or scouts—by the Germans torpedo-cruisers—by English and Americans, super-destroyers—and by the French themselves *contre-torpilleurs*—anti-torpedoers. All through the 'twenties France continued to build these ships till she had 32, each ~~class~~ a little larger than the one before it, each a little better armed, till the climax reached was with *Volta* and *Mogador* of 1932, which have eight 5.5-inch guns and ten torpedo tubes on a displacement of 2,900 tons, with a speed of 38 knots. None of the class are more than a knot slower; *Terrible* of the 1930 class did 45 knots on her trials, which is nearly 53 miles an hour, and a lot of speed for anything that must cut water.

In tactical exercises these ships showed they were as good as they had been planned to be. In short, the *Jeune Ecole* had a success on its hands; and it was with extreme reluctance that French naval men contemplated the change in the whole basis of their naval plans that the reintroduction of the battleship would bring.

But there was no help for it. Germany had *Deutschland* on the ways and had announced the building of a second ship of the class; and the French felt these ships had to be outbuilt.

IV

The design of the first French battleship, the first battleship of any kind, built in more than ten years, was the product of many and somewhat complex factors. Both English *entente* and French tactical doctrine

required that she should not be so large that her loss (perhaps by torpedo or mine) would amount to a national disaster. The same torpedo doctrine demanded that she be particularly well protected against underwater explosions. The new ship—*Dunkerque*—therefore received something hitherto unheard-of—underwater armour, right down to the keel, connecting with an elaborate series of longitudinal and lateral bulkheads, also armoured and braced into each other.

In fact, although *Dunkerque's* belt armour was only 11 inches thick (that of the last British battleships was 14 inches, and of the last American 16 inches) over forty per cent of her total weight was put into armour; more than in any ship before built.

Dunkerque's primary duty would be that of dealing with the German pocket battleships. Therefore she had to have speed enough to run them down, at least 30 knots. She had to have guns big enough to puncture their armour at long ranges and numerous enough to keep *Deutschland* under a rain of fire that would ruin her own shooting. The 12-inch gun, even in numbers, would not quite meet the conditions, although England had wished the 12-inch gun on the 25,000-ton ship. It fired a projectile of 870 pounds weight against the 670 of the German 11-inch. France had to go a little beyond English hopes and design a new piece of artillery, a 13-inch, firing an 1,193-pound shell, decisively to outmatch the German guns. Eight of these weapons gave *Dunkerque* a huge superiority over the six 11's of one *Deutschland*, and even a comfortable superiority over the twelve 11's of two, thanks to their hitting power and the relatively thin armour of the German ships.

But when these characteristics had been added up they came to considerably more than 23,333 tons; more even

than 25,000 tons. Some weight was saved by putting the eight guns into two enormous four-gun turrets, an arrangement with which the French had experimented before the war, though they never completed any ships with such turrets. Even then *Dunkerque* worked out at 26,000 tons, so France had to raise the ante on tonnage as well as on gun-calibre just a trifle above the level where England wanted it stabilized.

The French are a logical and legalistic race. It may be that they believed this demonstratoin of how decisively their navy, bound by its treaty restrictions, could out-build the German marine, bound by the document of Versailles, would be sufficient. It may be that they thought the building of *Dunkerque* would suffice to halt the construction of any more pocket battleships. If so, they were grievously mistaken, for Adolf Hitler had come into power, a man without logic, who despised legalism. He announced the laying down of the third, fourth and fifth pocket battleships, too many for *Dunkerque* to handle alone. France replied with a second *Dunkerque*, named *Strasbourg*.

The moment was ill chosen. Mussolini was already making motions in the direction of Abyssinia and the French were making faces at him over it. Germany stood his only friend in the matter, and the treaty structure allowed him to return the compliment with battleships. For the Franco-Italian naval accord had fallen through; Italy was bound only by the Washington treaties. Those documents allowed her as many battleship tons as France, which could be put into ships up to 35,000 tons apiece.

Strasbourg, like her sister, was being built against Germany, but Mussolini now affected to believe she was being built against him. Using the treaty restrictions

against France as France was using them against Germany he laid down two battleships which should have 35,000 tons against the *Dunkerque's* 26,000, nine 15-inch guns against eight 13's (that is, 17,280 pounds weight of broadside against 9,544 pounds), 32 knots against 30. They outclassed the *Dunkerques* by almost exactly the margin the latter outclassed the *Deutschlands*; and they were the signal for the new naval race to begin.



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V

THE ITALIAN FLEET:

WAR IN THE MEDITERRANEAN

'YOU ARE SENDING US to our death,' the Italian admirals are reported to have said when Mussolini told them they might have to fight England at the time of the 1935 Ethiopian crisis; and an American journalist commented that twenty-four hours after the declaration of an Italo-English war, a ham sandwich would cost five dollars in Rome. Yet it was England that failed the hurdle. English ships steamed from the central Mediterranean towards Gibraltar and Alexandria in a flight that was called a 'strategic concentration'.

The reason behind the paradox became apparent when the Alexandria division was presently joined by two old cruisers whose original armament had been removed to make room for heavy batteries of the latest and most powerful anti-aircraft guns. Italian strategy from Mount Atlas to Mount Taurus is based on the intimate co-operation of shore-based aircraft with ships. There can be no comprehension of sea power in the Mediterranean unless this fact is kept in the foreground. It grows out of Italy's painful lack of the vital raw materials of modern war. It explains her desperate struggles to obtain access to one of those raw materials—petroleum, the only one an air force cannot do without.

When Mussolini marched on Rome Italy was the weakest of the seven first-class nations. A condition from the source of Fascist power required the new dictator to make 'the strongest, and at a speed hitherto

unknown. The type of military strength is a matter of

slow development—years, decades. A first-rank army is even slower in development; and concentration on his army had for Mussolini the special objection that he required the shadow as well as the substance. It was necessary to convince Europe (Italy included) that Caporetto had become a meaningless word.

A successful war against a first-class power would accomplish this result. Yet it was precisely because he did not have the resources to carry on a successful war against a first-class power that Mussolini wanted to impress the world with his military strength. Italy is altogether wanting in oil, cotton, rubber, nickel; dreadfully short on copper and does not produce enough food for her population. Among the critical raw materials she produces surpluses only in sulphur and labour. She is the neediest of the have-not nations in war or peace, an economic poorhouse, unless organized either as a nation of low-standard peasants or a parasitic military imperialism. ✕

Attention was therefore irresistibly directed towards the one department of military strength in which no nation had yet established such a commanding position and victorious tradition as England on the sea or the French by land—in which labour counted for more than material resources—which could strike across Alps or Mediterranean without encountering either the French Army or the British Navy—which could be most rapidly developed.

The air. It is not without importance that the doctrine of the 'lightning war', in which an enemy's resistance can be broken by bombing his civilian population into paralytic while his military resources remain virtually unimpaired, should be called the Douhet Doctrine, after a general of the Italian service. Douhet also claimed that in this

alone would the wars of the future be won. His doctrine became for a time the official theory of Fascism, but though the world well knew that Italy was building up her air force, fifty per cent discount was made for Latin dramaturgy until Balbo's flight to the United States. It was not the accomplishment of that long-range expedition by a mass of aeroplanes that sent a thrill of apprehension through general staffs, for the English could probably have done it as well and the American naval air service was shortly to do even better on a mass flight to Hawaii. It was an event that took place as Balbo's Savoias winged across France. They were giant seaplanes, torpedo-bombers, the heaviest and slowest (theoretically) of all aircraft. As they passed Paris a flight of pursuit ships, the smallest and fastest of all planes, rose to escort them. The French pursuit planes were unable to hold speed with the Italian seaplane bombers.

The demonstration showed that France had nothing that could stop the Italians if they would a-bombing go. That autumn the Italian fleet manœuvres were held off the coast of Sicily, and aeroplanes played the most prominent part.

II

Italy had thus reached a stage of pre-eminence in the air, and it was evident that her fleet was being built less for purely naval operations than as the supporting wing of that powerful air arm. In presenting the estimates for 1938, General Valle, Italian Under-Secretary for Air, publicly claimed that Italy already had strength enough in her air arm to prohibit sea operations to any Mediterranean power. He also stated that the nation's aerial forces

There are several points worth noticing about the doctrine of aerial control of the sea that this implies. In the first place it accords peculiarly well with whatever there is of Italian naval tradition. She may name her battleships after Andrea Doria and Caius Duilius; but both are too remote to be anything more than names in a book for the Italian sailor of to-day. The Italian Navy really dates from the creation of the nation it serves; the only fleet action it has ever fought was the battle off Lissa in 1866, a crushing, disgraceful defeat, marked by disorganization and cowardice.

The first sea victories or failures of a nation exercise upon its officers an influence deeper than thought. Their tradition tends to crystallize around the successful technique and conditions and to reject those which have failed in the hands of their predecessors. Italian tradition and training thus seem to avoid close fleet actions with the gun.

But the first triumphs of their navy were in that forgotten Italo-Turkish War of 1911. The opposition was far from strong, but Italy did well in high-speed raids and sudden bombardments of shore stations. The World War found this nascent tradition advancing to a more adult stage. Perhaps the greatest single naval exploit of the conflict was Commandant Rizzo's dash by night into the midst of an Austrian fleet with a motor-boat, from which he launched a torpedo into the ribs of an enemy battleship, sending her to the bottom.

Air attacks, especially where the torpedo is the weapon, have the same quality of intense, desperate and dramatic action, with huge rewards for bringing off the 1-to-100 chances against success. It is a form of action peculiarly suited to the Italian temperament. When it seemed possible that England might fight Italy ^{and}

Ethiopia, there were newspaper stories about an Italian 'battalion of death' of the air, sworn to dive their bomb-loaded planes into enemy battleships and perish with them, giving one life for a thousand. Both the fanaticism and the effectiveness of these suicide squads were probably exaggerated, but the force and effect of the tradition thus represented are important.

In the second place the Italian position in the Eastern Mediterranean invites and practically demands concentration on the aerial arm. Italy holds a great quadrangle of sea and air bases. Brindisi, with the adjacent Sicilian ports forms the north-western angle; Tripoli is on the south-west; Tobruk in Libya on the south-east; Rhodes and the Dodecanese Islands are the north-eastern point. There is no land communication among any of them save the 1,000-mile motor-road from Tripoli to Tobruk, waterless and harried by sandstorms. By sea the route from Brindisi to Tripoli runs past the door of British Malta and French Tunis; that from Tripoli to Tobruk is beset by dangerous reefs; British Alexandria flanks the route from Tobruk to Rhodes, and British Cyprus corks it at its destination point. Between Brindisi and Rhodes the sea route runs through half a dozen island gates where light craft might swarm in time of war.

But in the air Italy is mistress of the situation. The longest flying time among any of the possessions is the four hours between Brindisi and Rhodes. This is near enough to allow planes from any of the bases to support any other, arriving over the latter with still fuel enough in their tanks to fight a battle. Every possible enemy air base, with one exception, lies outside the quadrangle and is subject to attack from at least two of the angles, and offensive from any enemy air base must face concentrations from at least three Italian.

The exception is the British base at Malta; but it is far distant from any possible supporting point and the approaches to it are subject to crushing Italian flank attacks.

Thus geography makes air power the most important element of Italy's position in the Eastern Mediterranean; and the quadrangle of bases is the vital point in the whole Italian system. Through it pass not only the routes to Italy's African colonies, but also the much more important lines down which she must draw certain raw materials, among them the most indispensable of all—oil. Of the many things Italy lacks, she might conceivably run through a war on accumulated stocks, draw from her ally beyond the Brenner Pass, or find substitutes for all but two, and of these two oil is the more important.

However the Italians may make tactical attacks in this quadrangle, however they may take the strategic offensive elsewhere, they are and must remain on the strategic defensive in this area. It is essential that Turkey, which flanks Italian land routes to the Black Sea oilfields and surrounds the sea lines thither, be neutralized or dominated. It is essential that every possible enemy be deprived of the power of conducting a sustained offensive within the dangerous quadrangle. More than anything else the existence of this dangerous area explains Italy's violent interest in Tunis and the Suez Canal, which jut spearpoints towards the heart of it. Better than anything else it explains why the Italian Navy has been made into a supporting arm of the air force.

III

Let us inquire: What could unsupported aircraft accomplish against ships in the Mediterranean? What

could they accomplish with naval support, and what type of naval support would be necessary? When we have the answers to these questions we shall have not only a picture of the modern Italian Navy, but also of war in the Eastern Mediterranean.

Unsupported aircraft can be counted on (1) practically to interdict commercial sea-traffic except at night and under strong convoy. Cargo ships being without protective decks, slow, and with weak side plating, are vulnerable to aerial bombs. They need not be destroyed; a nice fire or a bad leak will effectively ruin a valuable cargo. If about one ship in ten can be thus damaged in an area, that area will probably be closed to commercial traffic, both through loss of tonnage and prohibitive insurance rates. From the Suez Canal to the southern capes of Sicily is over a thousand sea miles. Fascist bombers, bearing on this route at short range from all four points of the quadrangle could presumably close it to British commercial traffic, and by corollary to supply ships for Malta, unless the supply vessels were assembled under convoy of a battle-fleet in a military expedition of the first order.

(2) Aeroplanes can render a harbour or anchorage practically untenable at night, and the more important the fleet using the anchorage the more dangerous they make it. Ships anchored in a harbour at night are in their most defenceless state against air-raids, especially when these come oversea, that is, from a direction and at a time when it is difficult to scout the raiders in iradvance.

ba. Such attacks would be especially serious when anti-aircraft gunners, afloat or ashore, would be hampered by clouds or mist, for the bombers need not obtain a high degree of accuracy; they need only spray a line of bombs

across a harbour. Neither need their objective be the destruction of ships. If they can count on sending three or four units of a fleet to dock for repairs every time they make a raid, they will have accomplished their work and the anchorage will be untenable. In the Spanish Civil War planes serving the Nationalist cause crippled the Loyalist fleet, originally much the stronger, by such repeated night bombings from behind clouds. They also caused such heavy casualties among cargo vessels in Loyalist harbours as to render sea-borne carrier traffic beyond all reason inefficient and expensive.

It is noteworthy that these were Italian aeroplanes. It is also noteworthy that the Italian air service has been experimenting with a device called the *pazzo silurante*—‘crazy torpedo’—a torpedo to be dropped into harbours from great heights by means of a diminutive parachute and set to run in a spiral till it hits something. It probably would not do much damage in a well defended and well managed harbour (nets would seem to afford an adequate answer), but the fact of the experiments indicates the direction Italian thought is trending.

Alexandria and Port Said are within easy aeroplane reach of both the Tobruk and Rhodes air bases. The British harbour at Cyprus is so close to the latter that Lord Strabolgi told the British Parliament it had lost all meaning as a British naval station, proposing it should be exchanged for Cephalonia—and was sharply reminded by the Greeks that the latter island belonged to them. Malta, French Tunis, could similarly be made unsafe at night by attacks from Brindisi, the Sicilian airfields and Italy’s new island base at Pantellaria.

But the purpose of such movements would remain defensive, the prevention of attacks against Italy’s lifelines through the Eastern Mediterranean quadrangle.

Unsupported air attacks could not accomplish a great deal in this direction. In a long war they might starve out Malta; they might make it difficult for England to organize big expeditions from Alexandria or through the Suez Canal. But Britain also has an excellent base at Haifa on the coast of Palestine, and the air arm alone could hardly stop British cruiser and destroyer raids into the quadrangle. Moreover, air attacks on Haifa would be extremely costly, taken in the rear from both Alexandria and Cyprus. In other words, air power alone will never enable Italy to keep the surface and subsurface warships of the Western Alliance out of the waters essential to her.

But the modern Italian Navy is constructed around the possibility of bringing off the trick through the co-operation of air and sea power.

IV

We are now ready to look at the answer to the second of the two questions above; what air power plus sea power can accomplish in the Eastern Mediterranean. This is so much a matter of degree and comparison that no single answer will hit the truth. A large-scale sea-fight between Italian and British fleets would probably both open and close with violent attacks by Italian bomber and torpedo planes, but such a battle will never take place if the Italians can help it. Even a victory would not be much use to them. The English margin in battleships is so great that the lion of the seas would be sure to retort to such a triumph by abandoning other theatres of war and throwing enormous strength into the vital quadrangle. It is probably for this reason that battleship modernization and construction were the last things on the Italian naval programme to be undertaken,

and the first to be dropped when the Ethiopian war made its demands for labour and materials.

On the next stage down is the possibility of chaining the British heavy ships behind the fortifications of their bases at the extreme eastern end of the Mediterranean—Haifa and French Beirut, of which they would have the use. During the World War German submarines forced British battleships to take refuge far from the scene of action; Italy has evidently been counting on aircraft and torpedo-carrying warships (both on the surface and underneath it) to play the same role in the war of to-morrow. Even the tactical technique is obvious; the British used it themselves during the World War and against the Bolsheviks in the Baltic afterwards. Aircraft bombed the harbours at night, forcing ships out into the open where they were attacked by small surface torpedo craft or submarines.

The incidental character of the Eastern Mediterranean, its inlets, islands and reefs, greatly favours the operations of submarines, particularly when the latter can count on aerial co-operation. For the World War showed that the deadliest enemies of the submarine are another submarine and an aeroplane—the former by lying in wait for the raider under water, the latter by its power of seeing deep beneath the surface. Air control over a sea area thus means that its holder can operate his own submarines within that area and close it to the submarines of an enemy.

This has a special significance in the Eastern Mediterranean in view of the facts that submarines make admirable convoy for cargo carriers where attack by surface vessels might be anticipated, and that Italy's problem in these waters is that of bringing convoys through. Suppose a stream of tankers and cargo ves-

coming down through the Aegean under the Turkish, Rumanian, Bulgarian and various other flags. Suppose a force of British destroyers or boarding vessels assigned to stop these ships and examine their papers for evidence of Italian ownership. Could the process of halting and examination be carried on with Italian submarines lurking in every corner, ready to torpedo any boarding ship that so much as slowed up its engines? Probably not.

A priori, then, one would expect Italian naval building to have been marked by a great expansion of the submarine service. This is exactly the case. The Italian submarine flotillas, already the largest in the world except possibly the Russian, are being expanded faster than any other. Compared to the boats of other nations, these Italian craft have high speed and extreme cruising ranges on the surface at the sacrifice of the same qualities during submerged operation. Even some of the more recent and larger types are designed for only a 72-mile run below the water, less than French submarines of ten years since, for instance. The conclusion that they are not intended to wait under water, but to accompany and to overtake cargo carriers appears irresistible.

There are four classes of these submarines—small, medium, large, with a special division of 6 submarine minelayers. The small submarines number 55, only four of which are older than 1931, none of them newer than 1937, the 51 being practically sister ships. (It seems to be characteristic of Italian building that it takes place in spasms, the shipyards of the peninsula turning out all the vessels they will need in a certain class for many years and then coming, then building with equal fury in another class.) They are not much different from the small submarines of other nations, save in their cruising range of 4,000 miles, extraordinary for such small boats.

The medium class numbers 34. Here one encounters a surface speed of 17 knots, which in other navies is associated only with big cruising submarines; also cruising ranges up to 9,000 miles. The big submarines, not big at all by foreign standards, are still faster and have longer ranges, all but one special class of four boats, designed for very deep diving. One of the latter holds the record of having carried humans farther down than any other structure but William Beebe's bathysphere.

V

Except in the broadest sense the aeroplane is a poor partner for the submarine. The wide difference in speed makes co-operation possible only when they can meet at a rendezvous point, a matter always difficult to arrange, and the aeroplane's limited time range will not let her wait there long. While a movement is in progress they find it difficult to communicate, radio being unsatisfactory because of directional wireless and decoding operations; and the weather conditions that favour one type are bad for the other.

Italians, in fact, consider the true partners of their Savoia bombers to be the M.A.S., a set of initials that stood for *motoscafi anti sommergibili*—'anti-submarine sea-sleds'—when the first ships of the class were built, but to which Gabriele d'Annunzio interpreted in the more dramatic and to an Italian, more satisfactory *Memento Audare Semper*—'Remember always to dare'.

They are the only naval arm in which Italy may be said to have a definite tradition; the branch which attracts the ablest and most daring of the young officers, the arm in which the Italian temperament finds its most perfect expression. Beginning as two- or three-man jobs with a single torpedo in war days, they have grown

66 SEA POWER AND TO-DAY'S WAR

the latest class consists of twenty-ton boats moving at 47 knots, with a pair of torpedoes, eight depth charges and a crew of ten young daredevils, who would like nothing better than a chance to rush a battleship. Off Zeebrugge, in the Baltic and the Adriatic the World War types gave a good account of themselves. In night, fog, or narrow waters the modern M.A.S. would constitute a real menace to anything from a destroyer up. Italy has forty-four of them at present; each year a few more are built to keep the constructors' hands in, and they are a production item which could be turned out in quantity on the outbreak of a war.

Yet in spite of the ballyhoo raised around them it is hard to see the M.A.S. as anything more than coast defence units against inshore blockaders, or being used against some not-too-distant harbour or concentration point. Their endurance is limited, heavy weather stops them altogether. Specifically, they might operate from Pantellaria against Malta, or from Rhodes against Cyprus; it is just possible to imagine them creeping along the coast for a drive at Alexandria. They would be of little use in the wider waters of Italy's dangerous quadrangle.

The 59 Italian torpedo-boats probably have more meaning there. They are craft between 600 and 700 tons, of great speed, with about the gun and torpedo power of a World War destroyer, and in most cases a few mines. Italy has been building them in uninterrupted series ever since the war. To stiffen and lead their drive there are destroyer flotillas both numerous and good, now 74 ships strong, each class a trifle heavier, a trifle better armed than their British contemporaries. Like all Italian light craft they carry devices for making artificial wakes and fogs.

Early in Mussolini's game of empires it was evident that these light craft would suffer heavy losses by gunfire while running in to the short ranges demanded for torpedo attack. In other words, even though their employment in fleet actions might not be contemplated, they required some sort of artillery support, especially if they should come up against the giant French destroyers. In 1928 Italy accordingly began a remarkable new class of cruisers, the *Condottieri*, mounting eight 6-inch guns apiece on slightly more than 5,000 tons, with just armour enough to stop the shells of destroyer guns at battle ranges, and speeds in the neighbourhood of 40 knots, the highest ever attempted on ships of this size. The obvious intention was to use them as flotilla-cruisers; leaders for torpedo carriers, whose mission would be to see the attacking craft through the screen of destroyers surrounding an enemy fleet, or to engage cruiser divisions while destroyers attacked them. By 1938 Italy had eight of these ships afloat, each class of two a slight improvement on the pair that preceded them.

The light ships of the Italian Navy, then, consist of a huge submarine service; a number of M.A.S. which would become indefinitely large soon after the outbreak of war; something like 130 vessels of all sizes in the general category of the destroyer; the eight *Condottieri*; and at the apex of the pyramid, the eight treaty cruisers, fastest of their kind, fast enough to work with destroyers. Over all and around all is the immense Italian air service, not now relatively as far ahead of the British as it once was, but extremely formidable by sea, fully capable of gaining command of the air over the vital Eastern Mediterranean quadrangle.

The whole makes up a fairly complete picture of the type of warfare Italy would wage there. Submarines

lurking behind every reef; unexpected minelaying; constant harassing attacks by all types of torpedo carriers, constant use of fogs and smokes, and above all aeroplanes, aeroplanes, aeroplanes. It looks like the *Jeune Ecole* method of France, but it differs from it in two important particulars. The major weapon is one yet untried in naval warfare, the air bomb; and the Mahan doctrine of obtaining command of the sea, then proceeding to every other step, is rejected for the scheme of depriving the enemy of his command of the sea within a limited area and for a limited time.

VI

No change in the naval organizations of the world is more striking than that which took place in the assignments of the Italian fleet between the crisis over Ethiopia and that over Czechoslovakia. At the former date all the heavy cruisers, four divisions of the most powerful destroyers, 36 of the largest submarines, 16 M.A.S., were based on Spezia or Naples, facing the west and France. Two of Italy's four existing battleships were in for refit; the other pair was assigned to a 'coast defence squadron'. Based on Taranto, looking towards England in the east were nine of the *Condottieri* light cruisers, two divisions of heavy destroyers (eight ships), two divisions of light destroyers, nine medium and twelve small submarines. The major part of the flying squadrons were scattered from Taranto to Rhodes and Tobruk. In other words, the fleet was organized for a war of high-speed raids in the east.

But in 1938 the Taranto squadron is headed by two battleships (*Cavour*, *Cesare*) not so much refitted as completely rebuilt into new vessels, armed with a new 5-inch gun of high muzzle velocity and great range,

with their speed stepped up to 27 knots. Two more rebuilt ships (*Doria*, *Duilio*) are almost ready to join; two new giants (*Littorio*, *Vittorio Veneto*) with 15-inch guns are only a few months away. Serving with the battle-ships are the strongest of the heavy cruisers, the four *Zaras*, and the two last vessels of the *Condottieri* class (*Abruzzi*, *Garibaldi*). Technically, they are only developments of the earlier *Condottieri*; actually, they are quite different ships, 2,000 tons heavier, with two more guns and armour belts that enable them to fight light cruisers. The three divisions of destroyers accompanying these vessels are of the regular fleet type, medium vessels, not the heavy destroyers that would be used for independent operations. The submarine assignments under the new organization were not made public; the bulk of the aircraft continue to be pointed east.

There has been thus a fundamental change of strategic plans with regard to the Eastern Mediterranean since the day when Mussolini's admirals accused him of sending them to their death. Partly, no doubt, this is due to the incomplete success of the aeroplane in Spain, where it was a very good weapon of harassment and commerce destruction, a very poor one for achieving decisive results without heavy naval support.

But the main reason apparently lies in the great British fleet concentration at the time of the Ethiopian trouble. Italy expected there would be a good-sized detachment of the British fleet facing her; what she got was nearly half the battle-line of the empire, six of the biggest and best battleships, five heavy cruisers, an aircraft-carrier, and small ships in proportion. She had expected a concentration at Malta; it took place at Alexandria, out of reach of her M.A.S. Under the old organization plan there would have been no way of keeping so powerful

a force from clamping down on the supply lines to the Black Sea. In short, the concentration brought to Italy a sudden realization that war with England would not be an exhilarating business of attacks on a passive enemy, but a fight for life against desperate odds.

The unexpected strength of the British concentration at that time furnishes one of the reasons for the otherwise rather pointless conquest of the little Albanian kingdom, revealing it as a drive to overawe Yugoslavia and open up an alternative land route to Rumanian oil. It explains why *Doria* and *Duilio* were rushed through the rebuilding process, why *Littorio* and *Vittorio Veneto* were completed at hot speed and two new battleships laid down in the slips they vacated; it explains why Admiral Cavagnari, submitting the naval estimates of 1939-40, should declare, 'We must build more heavy ships at once.'

The objective of these heavy ships, the Italian strategy in the east, let it be repeated, is not victory, but defence. Italy can succeed in this quarter only by maintaining herself, by forcing England to spend a 1,500-ton destroyer or a 5,000-ton cruiser to sink a cheap 2,500-ton freighter. Her programme there is still that of swift partial actions, hit-and-run raids, aimed to cripple rather than to kill British ships by day so that submarines and aircraft can finish them by night. But she has decided that light craft, even with the help of aircraft, cannot do the job.

VII

By contrast the Italian problem in the west is one of a relatively easy and obvious offensive. France cannot possibly carry on a land war against the Axis powers without the help of her African troops, and it would be difficult for her to do so without the help of African

copper, cotton and rubber, to mention only three of the most critical raw materials. Troops and supplies alike must reach France along straight lines from Algiers and Oran to Toulon and Marseille. These lines are flanked by a great double triangle of Italian fortresses, the bases of both triangles being in the Italian homeland, along the lines Spezia-Naples, Naples-Palermo, the apices of both triangles being at the same point—Cagliari in Sardinia, its harbour recently enlarged and deepened to take an Italian battle-fleet, its flying fields improved and increased in number.

Yet up to 1936 air power did not mean nearly as much here as in the Eastern Mediterranean. Of all the Italian bases only Cagliari was in really good striking distance of the African-Toulon lines—that is, within such distance that bombers could be accompanied on their missions by their full quota of pursuit aviation. Or to put it otherwise, only Cagliari was closer to any point of the French lines than some French base. With French Corsica looming against it, the wartime value of Cagliari as an air base was dubious.

. . . Just before Hitler came into power in Germany a story made the rounds of Paris newspaper offices without any one daring to print it. According to this tale, foxy old André Maginot, then French Minister of War, had gone to San Sebastian in Spain, ostensibly for a week-end with an actress, actually to negotiate a secret alliance with the left Republican government of Azana, under which France guaranteed Spanish possessions in Africa in return for the use of a base in the Balearic Islands in a war with Italy.

The Balearics are the key of the Western Mediterranean. A French base there would crush Cagliari and drive Italian air power from the field; an Italian base

there would throttle France. Spanish politics put Azana out of office soon after the Maginot visit. But when he was returned, apparently for a long period, in the Popular Front elections, the Spanish Civil War broke out without loss of time—with the anti-Azana camp financed from Italy and powerfully aided by Italian arms.

It is not yet clear how high the price of this Italian help to Franco is going to run. If Italy is to have the use of a Balearic base and/or one on Spanish Morocco the French Mediterranean route from Algiers is probably irretrievably gone. Air and sea attacks from the two directions will break it, and France will be forced to use the triply longer and very inefficient route from Dakar to Bordeaux. It would not be necessary for Italy to stop traffic altogether any more than in the east. A loss of one ship in ten would cost the French so heavily in lives, tonnage and prestige as to make them abandon the route.

If Franco gives his friend Mussolini no more than a benevolent neutrality, the Italian offensive against the Mediterranean ferry would be naval with supporting aircraft instead of aerial with supporting ships. The present fleet organizations make this seem the most likely case. Eight of the *Condottieri* cruisers, strengthened by a ninth of the true cruiser type are based on Spezia. They are admirably adapted for dealing with the French super-destroyers, and they are backed by the three fastest Italian treaty cruisers (*Trento*, *Trieste*, *Bolzano*) and all the heavy destroyers. Italy has twelve new *Esploratori* building, armourless, with great speed, and eight 5·2-inch guns apiece; some of these are probably destined for the same service. All these ships together would evidently be operated in fast raids on convoys, a *guerre de course*, a running war. If England could be held in

check in the Eastern Mediterranean, the programme might work.

VIII

Yet the very statement of this policy brings out one of the three great weaknesses inherent in the Italian position. Italy simply has not the resources to outbuild England and to win from her the true mastery of the Eastern Mediterranean. While this is the case she must make no more than a running, raiding fight against France in the west. Even mastery of the air in both seas only makes Italian movements there into a special kind of *guerre de course*. Not only is there no case of a *guerre de course* obtaining decisive results in the whole history of man. It is the most arduous and racking of all forms of warfare for the men engaged in it. It demands the utmost in physical and moral stamina; even the hard-boiled Germans of the submarine service could not stand it and broke down towards the end.

Would the Italians stand it? Is the singing of 'Giovinezza' an adequate substitute for a great sea tradition? Italian ships are certainly handled better than of yore. The New York harbour pilots furnish a bit of disinterested testimony on the point. There was a time when they disliked to take Italian ships in; now they are glad to, rating them with the Swedes, who are the best ship-handlers of all. Yet the impression persists among naval men that this is a veneer; that when a few big shells come tumbling out of the skies on to them the Italians will revert to the type of which Marshal Murat said musingly, 'Put them in blue coats, put them in red coats, they run away just as fast.'

The second great weakness is in cotton, a material essential to the manufacture of high explosives. An

Italian official spokesman has declared they were able to get along without it, but the statement has about the same value as the fairy-tales about rocket 'planes and atomic power. It is the one critical raw material in which Italy has none, can obtain none from any potential ally, and would have difficulty in obtaining from potential neutrals in a full-dress general war. Even in rubber there are at least German chemical substitutes. Efforts are being made to develop Ethiopian cotton. If they succeed a reserve stock might be built up, but that will be a matter of many years, and meanwhile Ethiopia would be cut off in war unless England's grip on the Suez Canal could be shaken loose. American cotton would be cut off by blockade.

There remains only the possibility of cotton from Turkey; and Turkey is precisely the nation Italy has bitterly antagonized in her efforts to make the oil route secure. For oil-supply lies not only behind the seizure of Albania, but also that of Rhodes and the Dodecanèse, and both, but the latter particularly, are bitterly resented in Turkey.

The Douhet doctrine prescribed that from such a point as Rhodes Italy could cower Turkey into neutrality. But the Douhet doctrine has blown up in the faces of its inventors. In Spain and China civilian populations were not driven into unreasoning panic by air bombardment, but into unreasoning rage. And with the growth of the English air force, Italian 'planes have lost the power of blackmailing the Turks.

The third and most peculiar weakness of the Italian position becomes evident from a consultation of their navy list. That list contains two classes of ships not found in any other navy of the world—twenty large water-tankers, a big water-distilling ship, and a number of

small vessels of both types. Throughout her chain of Eastern Mediterranean bases, the shortage of local water supplies is acute—and dangerous. Pantellaria, the great air and submarine base between Tunis and Malta, has not a drop of its own and cannot collect rain-water because the annual rainfall at Pantellaria is nil. Tobruk also is parched, with hardly enough water to supply the needs of the peacetime settlement, say nothing of the demands of a good-sized fleet, a wartime defensive army, and several squadrons of aeroplanes. Tripoli meets its peacetime requirements but little more. Rhodes has plenty, but is a poor naval harbour, too shallow and with a crooked entrance. Italy has been building up and fortifying the much better anchorage at Leros in the Dodecanese, and there also the water-supply is inadequate. All through the dangerous quadrangle there is little water but what is brought in.

From the opposite point of view this opens up to Britain an obvious line of Eastern Mediterranean strategy—that of consistently attacking water-carriers, very weak and vulnerable ships. This type of attack would force the Fascist Navy to spend a large amount of its strength in furnishing escort to water-ships, and carried far enough might drag the Italian fleet into that stand-up sea-fight which it is anxious above all things to avoid. For she is out-gunned on the battle line and there is no day yet in view when the situation will be reversed. She can force English traffic to India out around the Cape of Good Hope; she might force French traffic to Africa out around Cape Verde; either or both would only give her a draw in the Mediterranean, leaving the war to be won elsewhere. And the longer a Mediterranean war drags on the worse the Italian position grows.

VI

THE PROBLEM OF SPAIN

ITALY'S POSITION IN THE famous Axis is clear. She must break the grip of the democracies on the roads east and west out of the Mediterranean before she can obtain the resources to become a truly first-rank power; yet until she obtains those resources she cannot by herself shake loose the Franco-British hold. Hence the German partnership, whose strategic implication is that Germany is to hold England so occupied in the North Sea that the latter cannot watch both gates of the Mediterranean. The crisis over Hitler's march into Prague was probably a phoney (for reasons that will be given later), but the strategy adopted by the Western Alliance at that time is undoubtedly the line they would take in an Axis war.

Briefly it consists in blockading Italy from beyond the range of her M.A.S., submarines, light cruisers, and aeroplanes. The detail includes a British concentration in the East, ready to take the offensive into the vital Italian quadrangle as soon as the first rush of the highly fragile Fascist air force slows up, and heavy enough to smash the Italian battle-fleet. Before Balbo's flight it seemed that such a force might be based on Malta and blockade the whole Italian peninsula. Air and M.A.S. power backed it up to Haifa and Alexandria and forced the western powers to assemble at Gibraltar another fleet sufficient to handle the Italian battleships, should they turn in that direction.

In March 1939 the fleet was French, and there was no doubt France could bring it to the required strength. She has, beside the new *Dunkerques*, three old battleships

(the *Bretagnes*), lately refitted, that outdo the revised *Cavours* and *Dorias*, in gun-power, range, protection—everything but speed. Behind these are two ships still older (*Courbet*, *Paris*), but big enough to deal some nasty blows in a fleet action. Operating with them are the French heavy cruisers, including the fine *Algérie*, and six new light cruisers of the *La Galissonnière* class, nine 6-inch guns apiece, with stout armour belts and high speeds, one of the most successful designs produced by France in the last thirty years. With these against the armourless *Condottieri* and seven battleships to four, the French admirals would have liked nothing better than to meet the Fascist fleet.

But three months after the second Czech crisis the Italians announced the laying down of nine new light cruisers, and the arrival of the *Littorios* would bring the battleship figures to only 7 : 6 in favour of the French, or approximately 70,000 pounds of metal per total main battery broadside to 57,000 pounds. The margin is too narrow for certainty in view of the tactical qualities speed confers on the Italian fleet and if it became a wartime actuality would demand British reinforcement for the French ships.

This fact is full of significance and danger for the western powers. In the first place it raises a question of organization and morale. British and French naval units have found it almost impossible to work under one command in the past. In methods of thought and training, in reaction to the split-second demands of an emergency, the two services are utterly at variance. Even during the dark hours of the submarine war, French and British ships found it necessary to work in separate zones, and when the two came together temporarily during an *alerte* the French dashingy torpedoed—a British monitor. Nor

is morale the only question; gun calibres and artillery methods in the two navies are so different that if Italian sea strength came near French, England would probably have to take over the whole question of guarding the straits, sending the French fleet up to guard the English Channel or pushing it out as an advanced force in the Western Mediterranean.

In the second place this proportionate growth of the Italian Navy reveals the whole difficulty of the democracies. They have a present superiority in naval armament, but it is an old thing in a new world. France is building four fine battleships of the *Richelieu* class, probably better vessels than the *Littorios*⁶ by reason of their heavier armour, though they mount eight 15-inch guns to the Italian nine. Thanks to her labour laws and financial difficulties, however, France has been extremely slow in completing these vessels. The first pair of *Richelieus* will probably not join her standard much before the second pair of *Littorios* is added to Italy's. *

'We must compete with nations which finance themselves with a stroke of the pen, and which place no real limit on the hours of labour,' said Premier Daladier recently. Time works for the Axis in the Mediterranean building competition. Another five years at the present rate will bring the Italian Navy past the French and completely alter the strategic picture. If the Franco-British alliance really believes war to be inevitable, they had better have it soon.

II

Perhaps the best hope that war is not inevitable lies in the fact that both sides are stronger for attack than for defence in the Mediterranean area. Even under the most favourable conditions Italy would find it difficult

to keep raw material transport running through the eastern seas. Even under the best conditions France and England would find it almost impossible to keep the fast, long-range Italian submarines out of the Atlantic, and there is a strong possibility they could not hold Gibraltar as an effective fleet base.

The place is immensely strong. It is England's greatest fortress, and the one to which she has given the most attention, for no other so vitally affects the naval strategy of so large an area. The whole crest of the rock is now covered with camouflaged emplacements for anti-aircraft artillery of the latest and most powerful type. Nobody knows how many land and sea guns there are or how deep the concreted casemates go into which those guns are recessed. Beneath and around them galleries drive deep into the heart of the mountain. They contain food, water, ammunition, and living quarters enough to enable a considerable garrison to withstand a siege of years. In spite of the fact that the rock itself is calcerous, of a character that bursts into killing splinters under the impact of shell-fire, it would probably take months of pounding from long-range guns to reduce it to such impotence that Italian surface ships could run undisturbed through into the Atlantic. In fact, the operation is so expensive in munitions and lives as not to be worth undertaking save as the last act of a long war in which the Axis was winning.

Yet from the standpoint of Axis strategy, it need not be undertaken at all. More than any other great military establishment of the world Gibraltar has become a fixed fortress whose only value is in passive defence. It has no aeroplane landing-field, nor is there any within control of its guns. This is important. Experience in China, Ethiopia, and Spain showed that anti-aircraft defence

can be achieved, but only when ground artillery works in close co-operation with defending 'planes.

Defensive aeroplanes force attackers to keep in the tight formations in which they make good targets for 'archie'; shell-bursts force them to spread and dodge in such a manner that the aerial defenders make them ready victims. In the specific case of Gibraltar, this means that the anti-aircraft artillery, powerful though it is, could probably be put out of commission any time attackers are prepared to foot the bill in losses that such an operation would entail.

It also means that bombers flying at sub-stratospheric levels by night could render Gibraltar's relatively narrow harbour pretty valueless. They could halt docking operations, slow up, if not altogether prevent, refuelling, stop repair work. And if bombers could do this, even more could heavy artillery emplaced on the Spanish side of Algeciras Bay, or even on the African shore at Ceuta. The range is only a moderate one for big guns. Which is to say that Gibraltar is safe from the sea, unsafe against air attack, and still more so against attack from the land.

III

This outlines once more the capital importance and enigmatic position of Spain with relation to any conflict in the Mediterranean. If the Fascist powers had the use of Spanish bases on the peninsula, in the Balearics or in Spanish Morocco, they could deprive the British and French navies of the support of Gibraltar without ever assaulting the place.

Note the effect of this. The French fleet must then base either on Toulon, Algiers, or Oran. Toulon is too deep in the Gulf of the Lion to give the slower French ships a chance of catching the Italians if the latter should

drive towards the straits from some such base as Palermo. More, such a condition presupposes a pro-Italian Spain, in which case a French fleet operating southwards would be subject to violent converging air and torpedo attacks from Sardinia and the Balearics. Algiers is as much too far south-east as Toulon is too far north; Italian vessels could work from Palermo through Cagliari, the Balearics, and down the coast of Spain without coming near the place. Oran has a fine harbour, strong fortifications, and a good dock, but is an advanced base only. Its hinterland has few industrial resources, and it also is a long way from the vital straits, no nearer Gibraltar than Cartagena in Spain.

In fact, it can only be the possibility of losing the support of Gibraltar that has caused the French Government recently to take up the development of a port whose name never now appears in the papers, but will be prominent there during to-morrow's war. Its name is Mers-el-Kebir; it lies right at the border of Spanish Morocco, an old nest of the Barbary pirates, now sunk to a dirty red-roofed village of a few thousand Moors and Jews. But the harbour that lies before the village is one of the best in Africa, one of the best in the whole Mediterranean. France seems determined to make a first-class base of it; gradually she is building up the communications by rail and road, laying down fortifications, and planting the hangars of a big air base.

Meanwhile, Mers-el-Kebir is a harbour of the day after to-morrow. To-morrow may see Spain at the side of Italy, the Algiers-Toulon route broken, the Dakar-Bordeaux route flanked through the Canary Islands, the British fleet driven back to base on Lisbon or altogether out of the Western Mediterranean.

IV

But would Spain be on the side of the Fascist powers? The matter is political, lying outside the scope of this survey, and there is a byword of the European chancelleries that predictions about Spain are always wrong, but we may examine the strategic influences leading into and growing out of the question. As far as sea power has anything to say it indicates that Hitler and Mussolini have bought no more than a benevolent neutrality.

Spain is useful only for her bases. Her air force is an import, her navy lost so many units in the Civil War and recovered from the Loyalists so many in damaged condition that a single British cruiser division could handle the whole thing. On the sea she is defenceless, and she must import a considerable portion of her food-supply. It seems incredible that any ruler of Spain would risk his own safety by subjecting his country to the rigours of a blockade in partnership with needy Italy and distant Germany.

Yet here also, as in the Franco-Italian naval rivalry, time fights on the side of the dictators. A recovered Spain, a Spain whose proportionate military strength had increased as rapidly as that of Italy in the last fifteen years or Germany in the last seven, would be in quite a different position. A British naval defeat severe enough to require a shift in the remaining fleets; a French naval defeat in the Western Mediterranean, might put the Axis powers in a position to demand that General Franco pay his debts in something beside kind words. Spain thus brings an element of danger and uncertainty into the sea-power calculations of the Western Alliance; an element of potential strength to the Axis and a mystery

to every one. Gibraltar is no mystery to any one but the officers who run around saying 'hush' every time the name is mentioned. There is a legend that when apes ceased to live on the rock the British would go, too. The last ape died a few months before Munich.



VII

GERMANY:

WAR IN THE NORTH SEA

THERE IS HITLER'S own word for it—the word of *Mein Kampf* which, unlike that of the diplomatic promises, has never been broken—that England is the last nation he wishes to fight. This does not represent an emotional Anglomania, but a clear and rational consideration of that strategy of raw materials which plays so important a part in modern politico-diplomatic calculations. In that realm it is Italy's obvious destiny sooner or later to fight England for the control of supply-lines now closed by British possession of bottle-necks. She can avoid it only by a change of national ideology as complete as that which brought Mussolini to power; a change which itself could hardly be accomplished by anything short of a war.

In one sense Germany is under no such compulsion. The nearest sources of supply for wheat and petroleum, the most vital of all the raw materials, run right away from England, overland to the East. In another direction she is under compulsions more severe than the Italians. Rubber, copper, nickel, tin, and mica are materials absolutely necessary for mechanical war. The German sources for all are either England itself or British dominions, and one of these materials, nickel, is produced nowhere in the world but in British dominions. Nothing short of a victory so sweeping as to amount to conquest would do the Germans much good.

The two nations are thus bound together by economics, separated only by political ideologies, a fact which helps to explain the peculiar character of their relations and

does explain the peculiar character of the German fleet. The new German Navy seems to have been constructed on a system of ideas swinging the poles between the hope it would not have to be used against Britain and the fear that it would.

The famous pocket battleships, loose on the ocean, might conceivably do a good deal of damage to British commerce, but it is in the last degree improbable that they would do enough to pay for themselves. Any one of England's three battle-cruisers would be capable of taking on a whole squadron of these vessels. *Renown*, *Repulse*, and *Hood*—all are faster, better armed, better protected than the *Deutschlands*. If hunting for them the battle-cruiser would undoubtedly be accompanied by one or more of the numerous English aircraft-carriers, which could drive the German shipboard 'planes from the skies and enable her English adversary to shoot her to pieces without ever coming in range of the German's guns.

But the pocket battleships are anti-French, not anti-British ships. It is significant that during the crisis before the Munich agreement the *Deutschlands* put to sea 'for manœuvres' off the coast of Spain. If that pinch had led to war they could never have regained Germany. They could, however, have run past Gibraltar to join the Italian fleet and be the spearhead of thrusts against the Algiers-Toulon line. When the *Littorios* were complete they would have given the Axis 69,000 pounds weight of broadside metal in the battle line against the 70,000 pounds French, and in spite of their relatively thin armour might easily have been used for just that purpose.

The French regarded it as something like treason on England's part to have signed the agreement under

which Germany kicked over the treaty restrictions of Versailles, but undertook not to build more than 35 per cent of England's naval tonnage. It came just after France had tailored her new *Dunkerques* to England's measure, and the fact that it was signed lay behind France's jointure with Japan in refusing to renew the Washington limitation treaty under any terms. Nevertheless it represented high tide in the ebb and flow of Anglo-German relations. For it is not possible among western nations to keep naval construction even moderately secret. At the time of the agreement both French and British naval men must have known that the final pair of pocket battleships (Nos. 4 and 5) were not to be pocket battleships at all, but full vessels of the line, on 26,500 tons displacement.

The information would be as horrifying to France as it would be pleasing to H.M. Admiralty. To the former it was the hour when Italy had just laid down the *Littorios*, so much more powerful than her *Dunkerques*, the hour when she was threatened from two directions. For the British it was the hour of expiration of the old Washington Treaty, when they were trying to swing the United States into line on the small battleship. They may well have hoped that the argument that America was proving less reasonable than Hitler Germany would be irresistible, and they had already reached the opinion that further to insist upon the letter of the Versailles Treaty was only to promote more such evasions of its spirit as represented by the *Deutschlands*. Indeed, England may well have imposed upon Germany the 26,000-ton battleship limit as the price of her complaisance over the demolition of Versailles. There seems no other reason why the Germans should choose this precise figure for their new battleships when they were

in any case committing a unilateral break of agreement. If they really expected to feel English anger, they might better have built 40,000-tonners that would deal with any ship in her navy.

II

When the new ships, *Scharnhorst* and *Gneisenau*, appeared, they were thus political ships to some extent—artificially small for their rate as battleships, armed only with nine 11-inch guns as against the eight 13-inch of the *Dunkerkues*. Possibly this armament itself was another British-pleasing gesture; England was then as enthusiastic about the 12-inch (or smaller) gun as she was about the 25,000-ton ship. Otherwise the *Scharnhorsts* are probably better ships than the French pair. They are rated at a knot or two less speed, but they have more armour on belt and turrets and have saved enough weight in the engine-room to put a good deal into qualities not usually shown in the tables. Some of this weight has probably gone into fuel capacity (*Dunkerkue's* 7,500-mile range is very low for a battleship), but in view of the history of German naval tradition and building methods it seems likely that most of this saving has been put into that internal subdivision and protection in which the German Navy specializes.

For the German naval tradition is, rather oddly, one of security. It aims at the elimination of all uncertainties through absolutely accurate mathematical calculation. It is thoroughly characteristic of the Germans to count Jutland a great sea-victory because the British lost more ships and men than they did. Their ships are the most elaborately protected in the world, their instruments are the best and the shooting done with those instruments more accurate than any in existence. Even strategy

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and tactics are conceived in Germany on a basis of pure mathematics, the objective being the elimination of error.

Now this sometimes produces perfectly astonishing results, as in the first two hours of Jutland; and if a formula is ever devised that comprises all life within the limits of a single equation it will undoubtedly be by a German. In the meanwhile it is worth observing that war on the fluctuant and uncertain sea has thus far evaded impalement on the butterfly-pins of German formulas. The *Deutschlands* are a good case. No ships were ever more accurately calculated; but when the first was placed in operation it was discovered that in a head sea water washed over her deck so badly she could barely fire her forward guns.

It was also neatly illustrated by one of the minor engagements of the World War when the German cruiser *Königsberg* took refuge up the Rufiji River in East Africa. The English brought down a considerable squadron to shell her out, but the Germans had taken away all the navigation marks and only two little river monitors could slide across the shoals to a position where they could shoot at their enemy. Both *Königsberg* and the monitors had to fire at high angle over an intervening wall of jungle; both had observers, the Germans in tree-tops, the English in an aeroplane. In gun-power they were not unequal, yet *Königsberg* was gradually pounded to pieces while the monitors were not even scratched.

The German shooting was simply too good. The cruiser's shells fell in salvos so beautifully bunched that a blanket would have covered the whole group. If one of those salvos had landed on a monitor's deck she would have been sunk instantly. But none did; the monitors shifted position uneasily, irrationally. The predictions

of the German observers as to where they would be for the next salvo proved constantly wrong. Their own gunfire, meanwhile, had the ordinary percentage of error; that is, their shells fell one here, one fifty yards away. Not oncè did all the shells of a salvo hit the German, but enough of them did to leave her a flaming wreck at the close of day.

The same chain of events on a different scale was observable at Jutland. The preternaturally accurate German gunnery sank two British ships and ruinously damaged a third within the first hour of fighting. But when big British shells began to break up the precision instruments, German humanity, not used to doing without its mechanical crutches, failed. Their shooting fell off badly; when twilight and smoke-screens closed the action they were being fiercely hammered with hardly a return.

Again—Sir Reginald Bacon, commander of the Dover Patrol, has commented feelingly on his fear of German surface attacks against the cross-Channel convoys at night during the war. The light forces the Germans could have assembled through the canals at Zeebrugge and Ostend outnumbered his own protective craft. But it was not logical that England should thus take chances in this fashion; the Germans did not believe she had done so, and never attacked the troop convoys.

In short, the German naval method can produce great results where the conditions respond to formula, as they did at the beginning of Jutland battle, as they did in the Baltic campaign against the Russians. But it has the specific weakness of leaving no room for any opportunities not foreseen by formula; it rejects favourable as well as unfavourable chance.

III

The fact that the Germans calculate makes it possible for their intentions also to be calculated. Simple arithmetic makes it clear that German naval plans at the time of the agreement with England were based on the possibility of an Axis war against the Franco-Russian alliance in which England would be neutral. The two *Scharnhorsts* would hold the *Dunkerques* and perhaps more of the French heavy ships in the north. The Italian fleet plus the pocket battleships, or even without them, would be a match for what the Gauls could spare to the Mediterranean.

In light craft figures were equally favourable to the Axis. Italy matched France in heavy cruisers; Germany could put into the struggle five splendid light cruisers, built in treaty-restriction days, with the same battery as the French *La Galissonnières* (nine 6-inch), worse ships than their rivals only in speed and about half an inch of armour. This placed on France the burden of holding off the *Condottieri* with her super-destroyers; or in other words, gave Germany and her ally a calculable margin of superiority in every class of ship but one—submarine and anti-submarine vessels.

In number of ships the French submarine service ranks second only to the Italian; in quality it is probably higher. And it must be remembered that modern naval science looks upon these vessels less as the commerce-destroyers they were during the World War than as indispensable fleet scouts, convoy and blockading vessels, or ships for sudden missions of surprise. One more indication of the specifically anti-French character of the building with which Hitler broke the Versailles Treaty is that it included beside the two *Scharnhorsts*, numerous

submarines and sub-chasers. If this building had been against England it might indeed have included submarines, but of an entirely different type; it hardly would have leaned heavily to sub-chasers, and there would certainly have been more cruisers.

The anti-submarine vessels of this first Hitler programme were ten in number, ships of a remarkable type, about 600 tons burden (about the size of a torpedo boat), armed with a couple of small guns, several anti-aircraft pieces, and given a speed of 28 knots. This is so extraordinary a speed for escort vessels, which normally need be only as fast as their convoy of freighters, that it has been suspected these boats were intended for some other purpose—perhaps as special anti-aircraft ships accompanying a fleet.

The submarines of the first group were very small (none larger than 500 tons, mostly 250 tons), very numerous (24), and very slow (13 knots surface speed), compared with those of other nations. This marked them as shallow-water boats of limited range, which could rule the waters of the German coast, thus preventing a close blockade, or of the Baltic. They might operate off the French Channel ports, provided they were not forced to take the long route round Scotland by British participation on the side of the French and the resultant closing of the Straits of Dover.

It should also be remarked that like the ships of most other nations, those of this first big post-war German programme had an alternative purpose. The smallness of the submarines made them economical for Baltic work; the escort vessels could serve as sweepers of mines, in which the Russians specialize. The *Scharnhorsts* are light for a battle line where they would have to meet 35,000-tonners, but their high speed and good protection make

them peculiarly adapted to deal with the two moth-eaten World War battleships the Soviet maintains at Leningrad. Even their guns, modern 11-inch, would probably outshoot the old Russian 12's.

In fact, the possibility of a Baltic war was Germany's best argument in negotiating the 35 per cent agreement. She used it to secure English acquiescence in the construction of a pair of heavy cruisers, the *Admiral Hippers*, in spite of England's general objections to the type. For it was known by this time that Russia had under construction two cruisers, *Kirov* and *Maxim Gorki*, with the singular armament of six 7.1-inch guns; there had to be something to oppose them.

The agreement accordingly comprehended these ships; Germany announced that she would add to her navy five more light cruisers and sixteen destroyers, and everything was very fair and above board.

IV

But this was before Munich, before the seizure of Austria, before the limitation conference of 1936 was earmarked as a flat failure, and the war in Spain made it evident that the democracies were gravitating into each other's arms. Finally, it was before the laying down of the first of the two *Richelieus*.

Technically, there was no reason why Germany should not build reply numbers to these French ships. The quickened pulse of British rearmament gave her a big tonnage margin to do it in, and she could always protest a fear of French attack. But actually Germany's Axis ally, Italy, had already replied to the *Richelieus*. The construction of more battleships against France was meaningless unless for downright aggression; and though

the Germans did lay down three new battleships, they made no other move to indicate an intention of taking the offensive against France on the seas.

On the other hand, the laying down of these ships coincided with three striking movements in German economic life. In one the Third Reich officially approved of tin-plated kitchen utensils for use throughout the country; in another it announced a new minor coinage in nickel; in the third a barter agreement was made with Chile, copper against manufactured goods. That is, Germany began to accumulate in readily available form, large stocks, war stocks, of the three metals she could not obtain but with English permission in time of war.

The Axis had reached the conclusion that it would be impossible to keep England out of any war in which France was engaged.

All German construction, all Axis strategy, from 1936 on is conditioned by this idea. The grand strategic concepts of the Axis are obviously based on the use of interior lines to counteract an expected fleet numerical superiority on the part of the democracies. This strategy is not one of making a straightforward struggle for power, but of using interior lines to obtain local victories in region after region. It contemplates a German fleet sufficient to force a great British concentration in home waters and at the same time to deal with the Baltic, perhaps undertaking an amphibian offensive there to capture the Leningrad base and knock the Russian northern fleet out of the combination.

It comprehends an Italian Navy strong enough to break British east-west communications through the Mediterranean, forcing another big English concentration in the Suez region; then, by use of the same interior lines principle, taking the offensive against French

north-south communications in the Western Mediterranean. The possibility of this attack is apparently counted on to produce what it actually did produce in March 1939—another Anglo-French concentration near Gibraltar. The success of this offensive might force still another French assembly at Toulon for the protection of home shores.

The ideal of the Axis would thus be to force the democracies plus Russia to maintain five separate fleets—in the North Sea, the Baltic, at Suez, Gibraltar, and Toulon—while the Axis kept but two, either of which might be thrown on to one of the enemy squadrons. Italian air power has already achieved the first step; the east-west line through the Mediterranean is already broken as of the date of war. If the Axis gets Spanish help the second step also is achieved. But this second step, and in fact the whole structure, rests on the postulate that Germany really can menace England in the North Sea. England must be forced to draw in so much strength for home defence that her Suez squadron will be too weak to attack Italy in the Eastern Mediterranean quadrangle, and the Gibraltar force too weak to keep totalitarian Spain from following the course of gravity.

To that object German naval building since the battle for Madrid has been somewhat reluctantly dedicated. At the bottom of the German fleet edifice are a number of motor torpedo boats which differ from the M.A.S. only in being called *Schnellboote*, thirty-five in number according to the latest annuals, with about sixteen new numbers being produced each year. They would probably be more formidable in German hands than in Italian, as the essential English trade-route through the Channel would be in good reach of such craft running along the Dutch coast by night.

Next in line comes the new series of submarines, notably larger, faster, and of greater range than those built in 1935. German naval critics have long maintained that the only thing wrong with the Tirpitz plan of starving England out by U-boats was that it did not start soon enough and with sufficient ~~in~~ ^{attl-} ~~tion~~ ^{ntly}. They are evidently planning that this mistake shall ~~be~~ ^{repeated,} for the submarine has become practically ~~ts.~~ ^{mass-} production item in the new Germany, the figures of January 1939 stating that there were already 43 afloat and 28 more building.

Above these comes a class of small torpedo boats, thirty in number. They are 600-ton craft, differing from French and Italian vessels of similar type in having much weaker gun armament (only a single 4.1-inch gun apiece) and much heavier torpedo armament (six tubes in the German, two in the French ships). 'I noted,' says Sir Reginald Bacon, speaking of the wartime Dover Patrol, 'that the German destroyers in the Channel at night used the torpedo as the first and deadly weapon, only firing their guns to cover a retreat.' This would seem to describe what these new torpedo boats are meant for, if one remembers that the development of artificial fogs and smokes has made it possible to produce a kind of night at almost any hour.

German fleet organization of to-day ties the destroyers strictly to the capital ships. Those built since the English agreement have just about kept pace in number with the flotilla requirements, and the sixteen ships built in the first rush marked the abandonment of the small destroyer policy of von Tirpitz. They were much like contemporary American destroyers, armed with five 5-inch guns, eight tubes, and given a 36-knot speed on a tonnage of 1,625. The second series of fourteen ships are more

definitely anti-British. The tonnage has shot up to 1,800 without any change in armament or speed, which probably means the extra size has been put into steaming endurance for long cruises. If the deduction be not too far-fetched, it would seem to indicate an intention to use the ^{new} ^{hence} fleet to which they are attached farther from shore than any German strategy has hitherto contemplated.

Yet German cruiser construction also seems to bespeak this intent. At the same time it illustrates perfectly the Fascist technique of demanding a logically not-unreasonable concession, and when it is granted, demanding further appeasements on the basis of the very situation created by the earlier display of generosity. England conceded the 35 per cent ratio and was gracious about the two heavy cruisers Germany laid down. In return she received assurances that Hitler would build no more ships in this obnoxious class.

The two cruisers were launched late in 1937, eight 8-inch guns apiece and a good deal of armour, much like *Algérie*, superior to anything of the type in the British Navy. Late in 1938 came the first of the five light cruisers under the agreement, and early in 1939 two more. But as these new ships lay in the docks of Bremen harbour—that is, when it became impossible to conceal from the most casual passing traveller what kind of ships they were—Der Führer made a statement. The 35 per cent treaty gave Germany the right to dominate the Baltic. In view of the fact that Russia was building more *Kirovs* that dominion could not be maintained unless Germany had more heavy cruisers. Therefore three of the five light cruisers would be heavy ships of the *Admiral Hipper* class.

There is no sign that Russia has any more than begun

work on more ships of
Hipper is worth at least two.
construction proceeds at such
two *Hippers* while the Soviets
their weaker ships. In other words
ingenious, and five heavy cruisers
England and each of them is more than
cruiser in the British fleet.

v

Just what employment is intended for them is
more difficult to determine. There is a school
thought which believes that in the war of tomorrow
battleship is destined to play somewhat the part of a
fixed fortress in a war on land. This school considers that
all the fighting down to the last desperate stand will be
carried on by minor units, battleships determining the
main lines of strategy by their mere existence, by a
count of numbers on the opposite sides. If this has
become German doctrine, they are counting on the
five new heavy cruisers to do some fighting in the North
Sea, or at least to attract the British heavy cruiser
strength to that region while the Axis' main strategic
plans are worked out elsewhere.

The German heavies could do a good deal of containing.
Their fighting power is so much superior to
that of the British types that England would hardly feel
comfortable against them unless she concentrated at
least double their number or else told off the battle-
cruiser squadron to the particular duty of dealing with
them.

On the other hand, if there is any outstanding characteristic
of the navy of the Third Reich, it is the complete breakaway
from the methods of the past, when von

RAY'S WAR

intended as sea-going
nally lived in barracks
ave only the smaller sub-
have cruising ranges that
can vessels intended for
st sweep of the Pacific.

is not a cheap characteristic, either
terms of the other qualities that must be
ain it. It is hard to believe that it would
all new German ships from destroyers up
Teutons meant to use it—that is, meant to
aval operations at long distances from base,
attles far beyond the limits of the North Sea. If
is the case, then the employment of the *Admiral*
pers is outlined as that of commerce-raiders, either
ugly or in small squadrons. In this role they would be
even more formidable to Britain than the pocket battle-
ships.

For the latter suffer from lack of speed. Their 26 knots
will not let them catch any warship they can beat with
the guns. Against a nation able to detach a fast battle-
ship to pick them up without weakening its main fleet,
they are only slow, weak, expensive cruisers. The
Admiral Hipfers cannot be caught by any battleship
afloat. Their armour gives them a big advantage over
any British cruising ship, and if they were loose on the
ocean in time of war it would take either a whole
squadron to hunt them down, or perhaps a detach-
ment of the British main fleet—some such unit as a
small carrier, a couple of light cruisers and an old
battleship.

There is a possible line of Axis strategy in this—*guerre*
de course, not as an end in itself, but as a means of carry-
ing still further the policy of forcing detachments from

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the main British fleet until the late autumn. It is a figure that will permit meeting it like this would seem to underlie the two German aircraft-carriers—*Gra* not yet launched or named. Their presence in these vessels in a Baltic war. Land at Königsberg or Memel would be in the North Sea land 'planes from the whole Frisian coast would probably any ship-based aeroplanes.

In fact, a carrier is very little use. The peculiarly heavy gun armament (no less than sixteen 6-inch pieces be anti-aircraft guns), and their peculiar armament of 'planes (only 40, less than any in Europe) makes it look as though the Teutons were experimenting with a new and dangerous type of carrier raider here. A couple of the German heavy carriers accompanied by one of these singular carriers lead to——

More speculation. The essential fact is that Germany is rapidly building a navy in which every ship, in all the ships in unison, are apparently designed for bringing about dispersion in the British fleet by pinning it to its bases by aircraft, or alternately, engaging it in decisive battle. At the apex of the structure are the new German battleships, two launched—*Marck*, *Von Tirpitz*—one almost ready for the launch another building. They are armed with eight 15 guns apiece, in four double turrets; they have armour equal to the best in the world, the speed approximately 30 knots which has become standard among the new ships. They also have exceedingly shallow draft—seven feet less than British ships.

AND TO-DAY'S WAR

r North Sea or Baltic; and the
of 118 feet, which signifies an un-
ternal subdivision and protection,
practically proof against mines or



VIII

BALTIC AND BLACK SEA:

THE RUSSIAN FLEETS

GERMAN DIPLOMACY HAS BEEN consistently and rather successfully directed towards the prevention of simultaneous war on the Baltic and North Sea fronts. In spite of her interior lines such an event would burden her with serious strategic questions, and especially would threaten her access to the fine iron of Sweden. Just as Anglo-French strategy must always face the possibility of a Spain in the hands of the Axis, so Teutonic staffs must consider the far more likely possibility of a Russia in the arms of the Allies.

War in the Baltic is inconceivable in any other terms than those of a Russian-German clash. Poland, steady opponent of the Nazis, has a 'navy' but it consists only of four big destroyers, a minelayer and six submarines. Its only base is at Gdynia, within easy land-gun range of German territory, or rather that of the Danzig Free City, which in war would amount to the same thing. Wiping out this Polish fleet or driving it from its base to internment would probably be the first and easiest operation of any general war. It is true that the Poles have been talking about making it more difficult by building a couple of battleships. But the modern battleship takes something like four years to build; long before any Polish ships of the type were afloat the German could pick their quarrel and eliminate the possibility, and it is probable they would do so.

Sweden also has a small navy. Pound for pound and gun for gun it is one of the best in the world, whether rated by mechanical equipment, training, morale, or

any other criterion. No nation has yet produced anything to equal the Swedish Bofors anti-aircraft gun. Their ships manœuvre with the precision of figures on a Nürnberg clock, and a winter visitor to the 'cold hell' of the base at Karlskrona can see big blond men skipping about icy decks as though they thoroughly enjoyed themselves. Among the shoals and passes of the Baltic their shallow-draft ships, manned by such sailors, would be decidedly formidable. But there are not enough pounds and guns—perhaps not even enough to defend Sweden's own coast. At the head of the list stand three pocket battleships, with four 11-inch guns apiece, much better protected than the *Deutschlands*, but still ranking as light craft for the purposes of modern war. There is a single aircraft-carrier, *Gotland*, a curious ship with eleven aeroplanes and six 6-inch; then eight very fast, powerful destroyers, a handful of submarines and another handful of older ships of all types.

Finland's case is similar. She possesses five submarines, all small, and a pair of locally built coast defence ships with four 10-inch guns apiece.

Both nations are such ardent lovers of peace as to enter very slightly into any strategic calculations. They would not enter at all were it not for the islands floating like stars in the Baltic. Bornholm, between Sweden and the Pommern coast, is Danish. Götland, east of Sweden, belongs to that country, and farther north, where the Finnish Gulf points its thumb towards Kronstadt, are the vexed Åland islands, semi-autonomous, but under Finnish suzerainship. All would make good air bases for Germany, or vice versa, according to the stage of the war in question. All would be more use to Russia, since otherwise her bombers must pass over a good deal of unfriendly territory.

Of these islands the Alands are much the most important in a military sense. Bornholm is high, rocky, without good harbours and so dominated by the German coast as to offer few temptations to a prospective attacker of the Reich. Götland also is bold in outline, and for Germany shares the disadvantage of Bornholm that it is not so convenient either for attack or defence, as places legitimately in her possession; for Russia it shares the disadvantage of Bornholm that it lies under the threat of German air power, and would be defended to the last by Scandinavians who could not well be drawn off by attacks from any other direction. Either or both of these islands might have importance in a Baltic war, but only in its last stages or in a sudden surprise operation.

But the Alands belong to Finland which marches on nearly all its land frontier with Russia. They have innumerable harbours and shoals where submarines and light craft could base; innumerable broad beaches from which aeroplanes could take off. From the Alands light sea and air forces could so slash into the flank and rear of any seaborne expedition towards Kronstadt as to render it an almost impossible undertaking.

Hence Russia casts covetous eyes towards the Alands; hence we have the nations of the northern Baltic, by tradition and feeling democracies, lining up on the side of their international political interests with Germany rather than on that of their ideologies. Hence, finally, the German strategic problem in the Baltic is purely that of eliminating the Russian fleet as a threat to her sea communications with countries from which she draws much iron, machinery, and food. German offensives to the north-east could have no other object. The German role in the great cold, shallow sea is essentially one of

defence through offence, like that of Italy beyond the Calabrian capes.

II

The question is—how much resistance could the Russians put up? They have never been a naval people, and through the ages have borne the reputation of the world's most incompetent seamen. 'Close with a Frenchman,' said Lord Nelson once, 'but manœuvre against a Russian and he will defeat himself.' It was still true a century later. Off Port Arthur and in the Yellow Sea in 1905 the Japanese threw strong Russian fleets into utter confusion with a few passes.

Nor is this naval incompetence so much a matter of national tradition, which might be overcome by conscious, intelligent effort, as the Japanese and Germans overcame a similar condition, as one of national geography. Without a true ocean frontage, almost without a mercantile marine, the Russians have no foundation on which to build. This is probably less important in an age when every warship is a box of machinery than it was in the past; but the Russians as a whole have yet to demonstrate aptitude for mechanics also. They produce some striking intellectual leader types of great mechanical and inventive ingenuity, but the bulk of the men from whom their naval cadres are drawn remain peasants who know more about a goat than a gear wheel.

In one respect and one only do they have a naval tradition of importance. When the submarine mine was invented, it was taken up more rapidly and thoroughly in Russia than anywhere else. Since the coming of the iron mechanical warship the successes Russia has achieved on the water have been almost entirely due to

the mining department. In the Japanese War Russian mines accounted for two Japanese battleships, a cruiser and some smaller craft, while all the rest of the Russian fighting forces together, with the big ships and their guns, the torpedoes and shore batteries, achieved no more than the destruction of three or four torpedo boats during the wild night following the Battle of Tsushima.

In the World War again, Russian mines did twenty times as much damage as Russian guns, even against the careful and scientific Germans. On one notable occasion a whole division of six German destroyers was caught in a Russian mine-trap and all six blown up. On another, two big German armoured cruisers steamed out of their home ports in a region where they counted on perfect security—straight into a new Russian minefield.

In what does the Russian skill in handling mines consist? Like most such skills it is partly a matter of taste, of national preference for devious methods that flower into stunning surprises. Partly also it is psychological—made up of the ability to predict the points at which enemy ship commanders will feel most secure, will allow their vigilance to relax. That is, Russian mining officers have learned how to plan their operations with reference to the enemy's probable moves. Finally, there is also included the skill of experience and training, the mechanical ability to make good mines in quantity.

Have the Russians lost any of those traits through the Revolution that swept away almost everything of the old Imperial Navy? The answer is a matter of guesswork helped out by a little deduction, but the best guess would be that they have lost nothing. Certainly the national taste for minelaying as a method of naval war remains unchanged. More than 70 per cent of the known surface

ships of the Russian Navy, including all the destroyers, are fitted as minelayers in addition to their equipment for other purposes; and when a Russian naval vessel becomes obsolete, she is not scrapped—she is converted into a minelayer. The oldest warship in the world is the Russian minelayer 25 *ago Oktiabria*, which was launched in 1873 as an armoured cruiser.

This preoccupation with mines is important not only in itself but also for the light it throws on Russian naval strategy in general. Of all naval weapons the mine is the most clearly defensive. Even when laid on the enemy's doorstep it can accomplish nothing in itself; it can only prevent accomplishments by the opponent. This strict defensive accords perfectly with the Russian national temperament as expressed in its general military tradition—one of a passive defence, so endlessly patient as to wear out the offensive powers of an enemy.

In the meanwhile, it is difficult to see what other line modern Russian naval development could have taken. The disastrous Japanese War not only denuded the nation of ships; it also wiped out all the ablest members of the officer corps. The paralysing social and economic crisis that followed the war prevented any early renaissance, and 1914 found the Imperial Russian Navy only just beginning to throw off that paralysis, just beginning to build a new battle-fleet and to make use of a new generation of officers. The Revolution of 1917 again destroyed the officer corps, which largely remained faithful to the Tsar, and left three-quarters of the new warships on the stocks. The Soviets thus had nothing to start with but the national temperament and the mining technicians.

III

Both temperament and technicians slanted the naval effort of the new government sharply in the direction of static defence—when it began to give serious thought to naval matters, which was at about the time of the Five-Year Plan. The Plan itself, with its emphasis on mass-production, inclined thought in the same direction. Mines can be produced along a belt in an assembly plant; warships cannot. The period is one that saw the conversion of several old Russian ships into mine-layers.

It now appears that the Russians placed small submarines in the same category as mines. The Soviet Navy is the most secret in the world. It gives out no information as to number of ships, their sizes or military characteristics. Its docks are so located as to be beyond eye and ear-shot of the ordinary traveller. Its ships visit foreign ports only rarely and up to now the visitors have always been ancient survivors of the Tsarist régime. Manœuvres are infrequent and held in waters so remote from ordinary traffic that nothing has been visible but a few grey hulls flickering through a smoke-screen, with the eccentric letters of the Cyrillic alphabet painted on their sides.

This veil of secrecy was so complete that down to the winter of 1936 no one knew much about the Soviet Navy. In that year a German publication startled the naval world with the announcement that Russia had 150 submarines afloat, all of which had been built since 1930, and many more under construction—that is, much the largest submarine fleet in the world.

The statement was denied, then hooted as preposterous, but a year later *Jane's Fighting Ships*, the

authoritative English publication, confirmed from various sources the existence of 112 of these submarines and the fact that at least 37 more were building. Since then, further confirmation and a few details have appeared, and no one any longer doubts that the original German statement was, if anything, an under-estimate of Russian submarine strength.

Well over eighty, perhaps nearly a hundred of these submarines are in the Baltic. They appear to be mainly small or medium types—only three are given as of 1,400 tons, and thirty as of 600 tons apiece, with the rest smaller. Nearly all (as one might expect) carry some mines. A fleet like this could wage a dangerous war of attrition against German commerce in the Baltic; perhaps so dangerous as to force Germany to eliminate this sea as an 'active front' by the seizure of Kronstadt before undertaking active operations in another direction. Russian concern over the independence of Estonia and Latvia seems based on the thought that Germany intends such an operation through one of these countries.

From the Russian standpoint, however, the enormous submarine flotillas are in the same strategic plane as mining operations. They are essentially defensive. A German torpedo boat flotilla, stiffened by a couple of light cruisers, would be a match for the whole Russian Baltic fleet with the exception of the two old battleships. The two *Scharnhorsts* are more than a match for these, their modern 11-inch guns firing a projectile of nearly the same weight and with a higher muzzle velocity than the 12-inch guns of the Russians, beside which the German ships are superior in speed and much superior in protection.

Up to the time of the celebrated treason trials, the completely passive policy seemed to have the support of

all the governing military minds of Russia. Those trials, it will be remembered, were closely related in time to the new Moscow doctrine of 'co-operation with democratic elements against international Fascism'. The wider political outlook this implied was apparently reflected into a widened military outlook; for the liquidated naval officers were those who had framed and carried out the passive defence policy in the Baltic.

They may have been guilty as charged. It is at least an interesting coincidence, however, that the moment they were out of the way Russia laid down twelve super-destroyers on French lines, as well as the *Kirov* class of cruisers, and began negotiating abroad for material to build battleships. It is another interesting coincidence that one of the vanishing officers was Admiral Orlov, the last of the old Tsarist-trained leaders; for the Imperial Navy had worked out for itself a special 'doctrine of the Baltic' after the Japanese War. That doctrine held that land and water operations around the Baltic should be viewed as a whole, the bottleneck at Denmark making the sea into a special enclave. Both Russian and German sea-frontiers on the Baltic were easy to defend, but the land borders offered easy lines of operation across the endless plains. Therefore (the doctrine held) the Russian Baltic navy need not challenge German command of the sea, only be so strong as to prevent German attack from the water.

At all events, the Baltic doctrine is gone with the men that maintained it. Russian naval policy has suddenly oriented itself in the Mahan-like direction of making a struggle for command of the sea on all fronts. An official Soviet statement has announced an intention of building a navy that need not take second place before England's; that will enable Russia to challenge Germany in the

west, Japan in the east and rule the Black Sea in the south.

IV

However many admirals are shot in arguments over the new policy, whatever the methods adopted for putting it into effect, it can hardly mean much unless about twenty-five years of peaceful development are allowed to intervene. Russian naval construction has never been remarkable for excellence. The nation entered the Japanese War with ships built in American, British, and French yards besides its own, and of them all the Russian-built vessels were decidedly the worst. When one of them, *Oslabia*, was punched by a few Japanese shells at the Battle of Tsushima, her armour-plates detached themselves from the side and slid quietly to the bottom of the ocean. Engine trouble or other mechanical defects at crucial moments were common among the others.

Nor does this weakness of constructional inefficiency appear to have been overcome. It is only a few years since a battleship and a cruiser made the voyage from the Baltic to the Black Sea. It was calm weather, and the cruiser, though an old keel, was newly completed, but she suffered so badly from slow leaks that she had to be hauled into a French yard in imminent danger of foundering. The engineers who repaired her described both construction and present condition as thoroughly bad.

In brief, the Russians are often brilliant ship designers, usually mediocre ship handlers and always bad builders. Some of the numerous reports of submarines breaking down and sinking in accidents may be 'counter-revolutionary propaganda' as claimed, or just wishful thinking

by people who do not like the Soviet, but they are too often repeated not to contain some truth. The fact that plans were bought and technical advisers sought in France for the construction of the super-destroyers; that the first number of a new class of very light cruisers was built in Italy; that an effort was made to purchase tailor-made battleships abroad—all indicate that the Russian warship building industry is not yet capable of standing on its own legs.

And shipbuilding is only half the question. There is also the matter of producing big guns that will fire a considerable number of rounds and armour plate that will stand up through the shock of battle. In Spain Russian light guns looked good and worked well for a few rounds, but heated up and racked themselves to pieces, and it is difficult to conceive why they are putting 7.1-inch artillery into their new cruisers if they are really capable of manufacturing good guns of heavier calibres. The armour question is similar. In the whole United States, with its enormous steel industry, there are not over six men who know how to make good heavy armour plate. Russia apparently has none. In the Spanish Civil War the armour on Russian tanks, so much lighter and easier to make than warship armour, was wretchedly uneven in quality.

Russia's intention of becoming a great sea power via the Baltic is at present just another Russian declaration of intentions in a beautiful and distant future. She may bring it off some day, but it will hardly be in time for to-morrow's war. In the meantime there are opposed to the Germans in the Baltic something between 80 and 100 submarines, seventeen destroyers which also carry mines, a dozen super-destroyers on the French model with perhaps more building, two *Kirov* class cruisers,

with possibly five more building, a handful of light torpedo boats, also fitted for minelaying, and an unknown number of motor torpedo boats. The collection does not promise to worry the German Navy for very long. At most it could only add to the cost in lives and money of a German amphibian offensive towards the Gulf of Finland.

V

The Soviets have also established a base on the White Sea and linked it up with the Baltic by means of a canal big enough to be used by submarines and by surface ships up to a destroyer in size. There has been talk of using the White Sea base for heavier ships also, which would be built there or brought round, but it is doubtful whether any have yet arrived.

The White Sea base, however, has considerable potentialities, for Soviet technicians have shown themselves especially skilful at making use of Arctic conditions. The harbour there is said to be ice-free all year round; at all times in the summer and with the aid of ice-breakers in the winter, numerous submarines could be shot out into the Atlantic by this route. This is *guerre de course* again, but a particularly troublesome form of it, for the port would be very difficult to blockade thanks to the Arctic conditions and the fact that Russia has a practical monopoly of ice-breaking ships.

VI

In the old Tsarist days the Black Sea fleet always rested on an entirely different basis from the Baltic organization. It was the dominating element in the area of its operations; had the energy and daring characteristic

of any military force more familiar with victory than with defeat. Historically it was the nursery of Russia's sea captains and the force that gained whatever naval victories she could claim. Captain Stark, the naval memorialist of the World War, has borne witness to the immense change in atmosphere between the gloomy lassitude of the Baltic squadron and the drive he found when transferred to the Black Sea.

At least one observer qualified to judge (Joachim von Kurenberg, formerly of the German Staff) is of the opinion that this condition persists. He has seen the destroyers and cruisers of the Black Sea fleet flitting across the horizon and declares the ships well handled. But even here there is doubt about the new Russian Navy's battle training. Their sailors are undoubtedly brave and devoted; the commanders, especially in the upper ranks, have yet to prove their quality. Finally, the Communist experiment of substituting a *Weltanschauung* for the more traditional type of discipline did not pan out in Spain. It did very well, that is, until the going got tough, then broke down.

Materially, the Black Sea fleet is relatively much better off than the Baltic squadron. There is one old battleship, the one that came round from Leningrad, probably at least as efficient as the single old Turkish battle-cruiser that is the only other capital ship in Black Sea waters. There are four cruisers, one an experimental type with the peculiar armament of four 7.1-inch guns, two light cruisers of 30 knots rated speed (whether they can make that much is dubious), armed with 5.1-inch guns, one old light cruiser, a flotilla of six destroyers, and about thirty submarines. As usual with Russian ships, nearly all are fitted for minelaying. A small aircraft-carrier has been reported building there, and possibly some of the

new super-destroyers. Even without these last Russia effectively commands the Black Sea and will continue to command it unless the Germans smash through by land to set up an establishment on its shore.



IX

THE RENAISSANCE OF ENGLAND

RUSSIA IS THUS as yet in no position to exert any serious influence on German naval plans. The fact may explain Britain's reluctance to make many concessions for an alliance with the northern bear. On the naval side it would be all give, no get, for England; and the British Empire which, a century and a quarter ago, arrogantly faced the combined fleets of a world, has allowed herself to slide into a position where she must seek naval help from any source that can provide it. The spectacle of a French fleet guarding Gibraltar is symptomatic.

The decline in the British naval position thus represented is first of all a moral decline. It may be dated from the morning of June 1, 1916, when Sir John Jellicoe, leading the Grand Fleet back to harbour after Jutland, received a frantic telegram from the Admiralty. The Germans claimed the battle as a victory, said this missive, on the basis of comparative losses. Some of the British Press and most of the American were accepting this claim; Sir John was begged to refute it.

Sir John, an admiral of the highly intellectual type, did not consider it necessary to point out the obvious fact that comparative losses were of small importance in a strategic sense with the German fleet driven back into its harbours under a stinging demonstration that any further sorties would be unsafe. Instead, he compiled from his captains' reports a list of German ships sunk. The captains were honest men but the action had been fought in fog and half-dark by ships ignorant of each other's points of observation and not sure of their own, and time was wanting for thorough correlation of their reports. Thus

Jellicoe's combined report came to declare that the Germans had lost five battleships, five light cruisers, six destroyers and a submarine.

Actually some of these represented the same sinking observed from widely separated points; in some cases German ships had been wrongly identified; and in others a German ship turning away into the fog in a cloud of smoke and flame was reported sunk when nothing of the kind had happened. The Germans had lost one battleship instead of five, and it was not difficult for them to prove it later. But the British Admiralty put out the whole list for propaganda purposes, giving it the weight of official authority. When the truth came out this made it look as though they were trying to cover defeat by deliberate mendacity, something the British Navy had never needed to do in all history before.

The next step in the process was the series of violent post-war controversies—over the handling of the Dover Patrol, over the failure of the Dardanelles expedition, and above all, between the smash-'em-up school of Beatty and the Jellicoe play-it-safe group over Jutland. In the course of these arguments things were said—they could not avoid being said—that gave hearers the impression the British Navy's achievement in the war had been limited to possessing so many ships the Germans dared not fight them. The revelation of how near England had been to defeat by the submarines in 1917 also contributed to the picture. By 1920 British confidence in the navy was beginning to shake.

The expression of this feeling was England's acceptance at the Washington Conference, of American parity in fleets, an act which contributed to reinforce the very thing that brought it about. A succession of pacifically minded Downing Street officials; the spread of the

'Oxford oath' never to take part in any war; the growth of confidence in the League of Nations—all contributed to the growth of anti-naval feeling, while the post-war decline in demand for merchant tonnage crushed the shipbuilding industry, which might have countered this sentiment. Between the World War and the failure of the London cruiser conference the British Navy built only the two battleships permitted under the Washington Treaty, three divisions of destroyers to replace worn-out ships, and the Treaty tinclad cruisers.

During the same period France built up its great fleet of submarines, the torpedo boats, destroyers and super-destroyers and three light cruisers; Italy produced her many small torpedo boats, large numbers of submarines and the eight *Condottieri*; Japan built nine light cruisers, a flood of destroyers, many submarines and two aircraft-carriers, and the United States the heavy cruisers so much better than the English types.

Englishmen were just beginning to realize that their navy was falling behind when the Invergordon mutinies broke out. They were passive in character, refusals of duty by sailors protesting against those old sailors' grievances—poor pay, poor food, shortage of leave. But they were mutinies; they dealt heavy blows to the nation's already-shaken confidence in its navy. The Government injured matters still further. The officers of the ships had been guilty of nothing but executing policies passed down to them from above, but they were made scapegoats for the whole business. Official sanction was thus given to the view that things were seriously wrong within the service itself.

On the heels of the Invergordon business came the crisis with Italy over Ethiopia, with its startling revelation of the weakness of British marine air power. Since the

early days of the World War, both the land and sea air forces of England have been concentrated as a single arm under the title of the Royal Air Force. This arrangement works very well for some nations and under some circumstances. Italy, for example, finds it admirable. The aircraft that work with her fleet are, in any case, based on shore. For England also the single command was practical under World War conditions. Her aircraft had only to work across the North Sea from the homeland, or across the Adriatic from the shelter of the allied Italian bases. But under the revised conditions of 1935, the single command had lost validity for England. Fleet commanders operating at a distance from home were forced to make use of aviators not genuinely under their jurisdiction. These aviators lived and served under different rules than the sailors with whom they were in daily association.

There was also the question of technical development. The R.A.F. naturally thought of its own desires and objectives rather than those of the navy, and neglected some aspects that would have been particularly useful to the fleet. The story of the catapult is an instructive example. It was to the obvious advantage of an independent air corps to have the fleet aeroplanes concentrated aboard carriers, rather than scattered in small groups among gun-power ships, where they would fall more fully under the control of naval officers. The R.A.F., therefore, was not deeply interested in developing a catapult that would enable each battleship or cruiser to carry her own 'planes. No efficient type of catapult was developed, and at the time of the Ethiopian business only a few of the cruisers had any 'planes at all.

That imbroglio revealed to England and the world how little the mistress of the seas was prepared to strive for

mastery of the air above the seas. It also afforded, for the first time in hundreds of years, the spectacle of a British fleet running away. The downswing had now reached bottom; the British rearmament programme followed swiftly.

II

When rearmament began it found the British Navy with few truly modern ships beyond the unfortunate heavy cruisers, a handful of destroyers, a sprinkling of new submarines and a considerable number of escort vessels. The treaty powers were not restricted as to the numbers of this last class; and the class was defined in the treaties as consisting of warships of less than 2,000 tons, with no guns exceeding 6-inch and speed not exceeding 20 knots. The result is a type of ship very useful against submarines and aircraft, either on patrol or convoy work, and almost useless against anything else. England has 38, with more building, and 40 minesweepers which can be used for the same purpose. Most are weakly armed, but the latest numbers carry eight 4-inch guns apiece, and would have something to say even to a destroyer.

Next above these, when the rearmament programme began, stood England's single big minelayer, *Adventure*, built on a cruiser's tonnage. She is a true freak ship, armed with only four 4-inch guns. (An otherwise somewhat similar French ship, *Emile Bertin*, has an armour belt and the full cruiser armament of nine 6-inch.) Built in 1924, the depressed era of the British Navy, *Adventure* would be a headache to any admiral who had her under his command in time of war. Her relatively low speed (28 knots), weak guns, and poor armour would make it necessary to assign quite a heavy group of other ships to protect her during the execution of any mission.

Before rearmament the British submarine flotilla consisted of a number of wartime relics, now fully obsolete and rapidly vanishing from the navy list, and eighteen big patrol submarines, built from 1926 on. Most of them have been assigned to the China station, the only one where their wide cruising range can be used.

There are 57 older destroyers on the list, belonging to the V- and W- classes (England gives each class of destroyers names beginning with the same letter of the alphabet). All were war-built, small ships of limited range, with three guns and six tubes apiece. It has been proposed to take the tubes out of these ships, put in more sky-guns and convert them into fast escort vessels and anti-aircraft ships. One, *Whitley*, has been experimentally so altered. Then come 34 destroyers of the A, B, C, and D classes, faster, stronger, more modern ships, with much better cruising range, four 4.7-inch guns and either six or eight torpedo tubes apiece.

Twenty-two light cruisers, including one Australian, were of World War construction. All but two are under 5,000 tons each in displacement. All are well armoured; all but two had either five or six 6-inch guns each. The last two (*Emerald*, *Enterprise*) completed after the war, have seven 6-inch, and like the others, each gun mounted in a separate little armoured gunhouse. The arrangement was a favourite one with British constructors of war days. It is wasteful of weight and space, but makes for good gunnery and hits deprive such ships only of a very small percentage of their fighting power.

However, even before the rearmament programme began all these ships were sliding rapidly towards the scrap-heap. They had been hurriedly built and had seen hard usage, wasted fuel, found it difficult to hold speed, were no longer a match for the light cruisers of other

navies. Two of them were converted to anti-aircraft ships at the time of the Italian trouble. More are said to be scheduled for the same conversion.

At the very edge of the rearmament programme stand the eight light cruisers of the *Leander* class, built when England abandoned the heavy cruiser as a fleet type. They carry eight 6-inch guns on a displacement of 7,000 tons at a speed of 32.5 knots. They have a treaty cruiser's armour—a narrow patch over the boilers, 2 to 4 inches thick; a treaty cruiser's range—12,000 miles, and the 'ideal' gun arrangement of four twin turrets. Good ships, but hardly fast enough to handle the light Axis ships and hardly powerful enough to deal with the later Axis cruisers, they are probably destined for patrolling commerce routes. Three have already been turned over to Australia.

Then came the heavy cruisers, fifteen in number, then five aircraft-carriers, all of them old ships, converted from other purposes, all relatively inefficient in a modern navy because of old construction and the compromises made necessary by adaptation to a purpose other than that for which the structures were designed.

Finally there were the battleships, the backbone of the British Navy. Five belong to the *Royal Sovereign* class, built during the war (one of them, *Revenge*, fought at Jutland). They have eight 15-inch guns apiece, 22 knots speed, and 13 inches of belt armour; well protected below water and above, ships of the line of battle in the full sense of the term, whose only defect, and that a slight one, is a low freeboard that might make difficulties if they had to fight in a heavy seaway.

Built at the same time were the five ships of the *Queen Elizabeth* class, their design the masterpiece of Sir Philip Watts. On only a thousand tons more than the *Royal*

Sovereign, with the same gun-power and ample protection, they have a speed of 25 knots. At Jutland they saved the hard-pressed battle-cruisers of Beatty, ruined the German battle-cruisers, fought the whole German fleet for a time and did not come off worst in the encounter. They form the best squadron in the British Navy, and they were the ships assigned to Alexandria to meet the growing threat of Italian sea power.

Of the three British battle-cruisers, *Renown*, famous as a royal luxury liner, and her sister, *Repulse*, are a pair of the late Lord Fisher's wartime freaks. He had a theory that 'speed is armour', and built these two ships, together with three others, *Courageous*, *Glorious*, and *Furious*, almost without protective plating, but with enormous speed and heavy guns. Sir David Beatty refused to have the latter three in the Grand Fleet at all (in their only brush with the Germans a light cruiser's shell punctured *Courageous*' side) and they were converted to aircraft-carriers. In *Repulse* and *Renown* the abnegation of armour had not been carried quite so far, and the guns were six of those excellent 15-inch mounted on the *Queen Elizabeth* class. They were therefore refitted after the war, and have undergone four reconstructions since. Their thin armour still leaves them relatively weak units for the battle line, more fitted for some such task as running down raiders or dealing with heavy cruisers.

The third battle-cruiser, *Hood*, is a pup from a different litter. Laid down in the late days of the war as a reply to a big ship being built by the Germans, she was supposed to be the first of a class of four. She has remained the largest warship and the fastest big ship in the world ever since—43,000 tons, and 32 knots. Her armour almost matches that of the *Queen Elizabeth* (the turret armour is heavier), her speed compares with that of a light cruiser,

her eight 15-inch guns allow her to stand up to any battleship—and her appalling cost was one of the reasons for the Washington limitation treaties.

The most recent British battleships are the pair laid down at the time of the Washington Treaty, *Nelson* and *Rodney*. They are the remains of six monstrous battle-cruisers of 48,000 tons each just ordered when the conferees sat down around their green baize table. These six, intended to overmatch the six American battle-cruisers then building, were to have had twelve 16-inch guns in four triple turrets. The American ships were scrapped under the treaties; England was allowed to complete two of hers on the reduced tonnage of 35,000. It is typical of the British mentality that instead of preparing an entirely new design to fit the tonnage limit, they made an effort to salvage as much as possible of the original design.

One turret was dropped out, with its guns. Another was moved from the normal aft position to be posted behind the two forward turrets, making three three-gun turrets in a group, an arrangement that allowed considerable savings in armour, but pushed the fire-control tower and navigating bridges far back, aft the middle of the ship. To give the main guns good arcs of fire the secondary, anti-torpedo armament then had to be grouped in smaller turrets and stationed still farther aft; and the trimming down of engine weights necessary to get the ship into 35,000 tons brought the speed of the ships down to 23 knots. The result was a pair of freaks of the most pronounced type. *Nelson* and *Rodney* have tremendous weight of broadside and more guns firing ahead than any ships now in existence. They have better gun protection than any but some of the American giants. But they cannot fire a gun astern, and they have

been aground more frequently than any other ships in the British Navy.

At first this was thought to be the fault of the officers, who received black marks. Time showed that the position of the bridges made it almost impossible for navigators used to handling ships from near the bows, to judge distance and turning circles aright, and the weights of the two were so distributed as to make them ungainly monsters, difficult to fit into any modern battle line.

All told then, the British fleet at the time of the rearmament programme was a heterogeneous collection, difficult to fit into any unified battle plan. The battleship speeds ranged from the 22 knots of the *Royal Sovereigns* through 23 for the *Nelsons* and 25 for the *Queen Elizabeths* to 31 and 32 for the battle-cruisers. Belt armour varied from 9½ inches to 14 inches; cruising radii varied from 4,000 miles to 14,000. The fighting conditions favourable to one set of battleships were the worst possible for another type. The heavy cruisers were not of a design to combine well with the other ships and weakly armoured. The light cruisers were greybeards, outclassed by foreign vessels, and by British standards, altogether too few in number. The aircraft-carriers were makeshifts and inefficiently operated. The submarines were relics or too big for European waters. The destroyers were smaller and slower than Continental types and formidable only in number. The whole fleet presented the aspect of having been built in fulfilment of a variety of strategic and tactical plans, each dropped soon after it had been instituted.

III

There is no such variation and inconsistency about the navy of rearmament. Its basic principle can be most

easily summed up in the phrase 'smothering the opposition'—a modern development of the idea that has governed British naval construction, tactics, and assignments for so many generations as to have become the most important element in the naval tradition of the Empire. Like all military traditions, an instinctive expression of the national spirit rather than a reasoned growth, this fundamental British doctrine may be rationalized somewhat along the following lines:

'We British are a shipbuilding, seafaring people, a naval race. National necessity, the result of our geographical position, national taste, the bent of our dispositions, cause us to concentrate our commercial and military effort on the water. By a clear realization of this fact, by maintaining this concentration of effort we shall be able to bring to any field of sea action forces superior to those of any nation that must spend considerable portions of its strength on land armies.'

Let us see where this doctrine leads and how it is expressed in modern British concepts of strategy and tactics. In the first place we should note that even when faced by a combination of enemies in any part of the globe, the British Navy possesses interior lines. In the Napoleonic period the powerful but separated fleets of France, Spain, Denmark, and Russia, which together were numerically superior to the British fleet, could not be assembled without separately passing through waters controlled by England; and even the separate French squadrons at Brest, Rochefort, and Toulon were subject to the same disability. To-day this fact operates with equal force against any two or all of the navies of Germany, Italy, and Japan. The possession of interior lines enables England, in a broad strategic sense, always to

contain one enemy and throw upon another a concentration that will crush him.

Pausing to remark that Italian air power has already broken one of these interior lines—that across the Mediterranean—it is next discoverable that this strategy imposes upon England certain strategic responsibilities. It is the enemy of the very big ship. British sea power is required by the conditions of its existence to be flexible, to be distributed among the largest possible number of units. Under modern conditions this means that British warships will almost necessarily be individually smaller, but larger in numbers and in aggregate fighting power than those of possible opponents.

There is also imposed upon England the obligation of really crushing one or more of her opponents. In the World War the Allied naval preponderance was so huge that this was unnecessary. It was possible to contain all the enemy naval forces—a process sensibly aided by the reluctance of the Germans to try a battle in which the results would be mathematically uncertain. But as against the Axis powers, especially if Japan be among their number, this is not possible. Britain has a superiority over them, but only a battle superiority, not one that will enable her to chain all the Axis fleets to their harbours at once.

If one of the Axis fleets is able to take the sea, or even to send any considerable number of ships to sea, Britain will be in a bad way through the effect on her world-wide system of commerce. More—a howl from populations for protection would go up that might force her to disastrous diversions of strength. Each raider on the high seas will take four or five times her strength in pursuing ships.

In to-morrow's war, it is therefore England's obvious

purpose to seek early and decisive battle against the fleet of one of the Axis powers—any one. It is as clearly the interest of the Axis to avoid any such thing, to maintain fleets in being that will absorb a large number of British watchdogs, meanwhile shaking loose surface, sub-surface, or air ships that can harry British commerce, even to get one of the Axis navies to sea for a long expedition against some strategic island.

This is the apparent strategic reasoning behind the energetic German naval construction. Germany cannot hope to win a building race against the British Empire. In the number of slips in which battleships can be built England outnumbers Germany by more than three to one, the same for smaller craft. It takes nearly as long to construct a new slip as to build the ship that will presently be laid down in it. If Germany should attempt competition by putting up new building slips England could meet her here, meanwhile continuing to lay down three battleships to every German on the slips already prepared.

But the German effort is not pointed towards any such direct competition. If they can produce at the rate of one to three, ships so powerful that it will take two British to contain one German, one of the first objectives of Axis strategy will have been achieved. England will be forced into the difficult and dangerous experiment of trying to dig one of the Axis fleets out of its harbours and choking it to death on the spot before attempting to blockade the others.

There is a secondary objective here, rooted in the Nazis' confidence in the soundness of their own industrial-economic theories, and outlined in Hitler's political tactic of creating continual alarms of war. Germany's immediate purpose in this direction is not so much to

outbuild England as to force England to outbuild her. Labour is the cheapest of all commodities under Fascism; under democracy, it is one of the most expensive.

Mere population statistics give the Nazis an advantage in this war of the shipwrights, whose ultimate object is to impose upon British economy enormous expenditures for arms and a series of sudden mobilizations. These things are a normal feature of life in totalitarian states, but democracies are not geared to support them continually, and the Nazis may well be hoping that the accumulated strains will one day break down British economic and political structure to such a degree that she will yield all demands without fighting. German military periodicals are full of the contention that England is having difficulty finding men for her new army, that the air force recruits are poor stuff, that the Admiralty is lowering its standards to man the rapidly expanding navy.

Here again, time fights for the totalitarians. England is showing, has shown, that over a brief period she can put forth an effort so prodigious as to render competition profitless. There would be no competition if she could demonstrate her ability to hold the pace. But France, which entered the race earlier, has already fallen behind her neighbour on the south and is showing the strain in a hundred other ways. Will England be able to do any better?

IV

It is specifically to meet the problems created by Axis building strategy that England has entered upon the re-armament naval programme, and she has entered upon it at a pace that indicates an intention to meet all problems at once and in a moment. The day the

Washington treaties expired the keels of two new battle-ships were laid. Three more followed within a year, and now there are four others building. Materials were collected in advance for the first five ships, plates were rolled and fittings manufactured. Two have been launched already; in 1940 they will be in commission.

These are the *King George V* class (*King George V*, *Prince of Wales*, *Duke of York*, *Beatty*, *Jellicoe*) to which all the first five ships belong. They are 35,000-tonners, like *Richelieu*, *Littorio*, and *Von Tirpitz*, the first effort of a new group of British naval designers who brought radically new ideas into the British Navy with the rearmament programme. The ships have ten 14-inch guns each in the main battery, a new calibre for England, and the guns are arranged according to a new plan—two four-gun turrets, one forward and one aft, with a two-gun turret firing over the big turret forward. The speed is 30 knots, which will probably be exceeded in practice; the belt armour 16 inches, the heaviest in Europe. For defence against surface torpedo craft, they carry sixteen of a new 5.25-inch gun with a perfectly exceptional rate of fire. Against aircraft the same guns can be brought into play, plus four of the formidable 'Chicago pianos'—40 millimetre pompoms, eight muzzles to a mount, firing a shell every two seconds from each muzzle—shell-firing machine-guns as a matter of fact.

They have a type of catapult new to the navies of the world, a track running right across the deck amidships which, with its clearances, gives the ships an odd, twin-mountain appearance. The arrangement is sufficiently peculiar. Other nations find it necessary to shoot aeroplanes off into the wind, and it is hard to see these big ships, or any others, stopping and turning beam to wind, which is the only way they could get their 'planes off in

the conventional manner. It probably means England has at last found an efficient high-speed catapult, one almost if not quite as good as the American powder-powered launching device, still the best in the world, and better than the German catapult, with its tanks of air and cumbersome compressor.

Indeed, the handling of the fleet air arm more than anything else marks the British naval renaissance of the last few years. A typical English compromise has straightened out the jurisdictional difficulty, naval pilots remaining in the R.A.F. but under closer naval control, training, and command. New 'planes have been developed, and no less than six big aircraft-carriers, more than any other nation possesses, were laid down in the rearmament programme. These are the *Ark Royal* class, true fleet carriers, moving at well over 30 knots, with 72 'planes apiece and emergency space for more; protected against air attack by sixteen guns of a new type, 4.5 inches in calibre, beside four Chicago pianos.

Behind the carriers, light cruisers—the class that has received more attention than any other in the rearmament programme. The first cruisers to follow the institution of the programme were the four *Arethusas*, named after the ships Sir Reginald Tyrwhitt so gallantly led from Harwich during the World War. They are small, 5,200 tons, with a high speed, thin armour, and only six 6-inch guns each, but a heavy anti-aircraft armament. This seems to mark them as flotilla cruisers, destined to work with destroyers along the fringes of the fleet, bringing a few 6-inch guns and some armour to the support of the scouting line.

Next come the ten *Southamptons*, big ocean-going ships of 10,000 tons, the same size as Treaty cruisers, but sheltered in four inches of belt armour and mounting

twelve 6-inch apiece. They were replies to a series of five ships laid down by Japan and they illustrate perfectly the operation of the British smothering technique. The Japanese vessels mount fifteen 6-inch against the British twelve; but the *Southamptons* are bigger, better protected, more seaworthy—and there are ten of them to five Japanese.

At least so goes the theory set forth in British official pronouncements. In practice, however, only two of the *Southamptons* are assigned to Eastern waters. The rest have been grouped in the 2nd Cruiser squadron of the home fleet, with the formation stiffened by a couple of Treaty cruisers. They are watching the German *Kölns*, with which they are admirably fitted to deal.

Perhaps the answer here, as in so many other places, is that England has not enough ships in the class to do everything she would like to have cruisers do. At all events there are now on the ways nine more of the *Fiji* class, with the same armament and speed as the *Southamptons* on 2,000 tons less. They will probably have slightly less armour, but even so would still be better ships than the Japanese cruisers and much better than the Italian *Condottieri*, opposite which they are likely to be brigaded.

Yet these same *Fijis* really represent an element in that altogether new pattern of strategy and tactics which has been practically forced upon the British Navy by the threat of the Axis. They need to be considered in connexion with the next two classes down, the remarkable *Dido* class of cruisers, and the equally striking 'Tribal' destroyers. Ten *Didos* are on the way now; more are to be built. They are 5,400 ton ships, cheap, of a simple design that could be produced in any yard, and turned out in quantity, like destroyers. But their most striking

feature is the armament—ten 5·25-inch guns, in five two-gun turrets, of which the first three rise above each other in a series of steps.

When U.S.S. *Michigan*, contemporary with the first *Dreadnought*, appeared with the inner pair of turrets mounted on tower-like barbettes behind the outer pair, there were questions all over the world as to whether she would not be unstable with so much weight so high up. She was not, and the practice of mounting turrets in this fashion became universal. But no one has yet dared to place a third turret high up behind the second; the huge topweight would be practically a guarantee of unseaworthiness.

Now if there is any one characteristic that marks British shipbuilders more than another it is the almost exaggerated attention they give to seaworthiness. For a generation builders in other countries have considered British cruisers under-armed and bulky because of the percentage of tonnage put into sea-keeping qualities. If they are putting turrets on the third level now, it must mean that they have no fear about topweights—that is, that the turrets are extremely light, with little armour and little handling machinery.

Certainly the 5·25-inch is a hand-operated gun, the heaviest that can be so operated. Certainly, like all chambered ammunition pieces, it has an extremely high rate of fire. The striking thing is that it should be adopted as the main armament of a cruiser. It has always been considered a cruiser's business to crush enemy destroyers and other light craft by the smashing power of the smallest power-operated artillery, the 6-inch. This fires a shell a little less than twice the weight of the largest hand-operated piece, and hence has per shell nearly four times the latter's destructive

effect, since the bursting charge advances slightly faster than the square of the calibre. Moreover, cruisers must often, even normally, count on fighting cruisers. Up to the present nothing less than a 6-inch was considered adequate to get through the armour of a cruiser and break up the stout internal construction usually associated with the type.

This is why the design of the *Didos* is radical. Yet considered in the light of the British fleet's probable opponents and probable tactics there is nothing startling about it. Who are those probable opponents? The Axis powers, together or singly. The scouting fringe of the Italian fleet, where light ships come into contact, is composed of super-destroyers, the *Condottieri* light cruisers, small torpedo boats, and will soon have the *Esploratori* coming along. On the scouting zone of the German fleet are the new 1,850-ton destroyers, with their five 5-inch; at the edge of the Japanese some very heavy destroyers and very light cruisers. None of these vessels have any armour to speak of. All will operate in and out of smoke-screens at speeds around forty knots, and can hardly be expected to be visible for more than a minute or two at a time. A light cruiser, even of the *Southampton* or *Fiji* class cannot get in many salvoes from her power-operated guns in a flash like this, and meanwhile the enemy will be laying a torpedo barrage.

But a *Dido* can get rid of eleven or twelve salvoes in two minutes, 110 to 120 5.25-inch shells, whose bursting effect on the light enemy hulls, built thin, with quantities of aluminium alloy, would be almost as serious as that of a 6-inch. This is a perfect curtain of fire, a super-barrage; even if it never hit a thing the series of splashes and bursts would ruin an enemy's aim, especially his aim with torpedoes, and the shock of all that high

explosive would shatter any exposed optical instruments, such as rangefinders. To make sure they do hit something the *Didos* are equipped with a fire-control system that discharges all the guns at once, in one continuous broadside. In other words, England is counting on getting in the first salvoes in these contacts of light ships, then shooting so fast the enemy will be unable to reply.

v

In one direction this is only a new version of the traditional British policy of smothering an enemy under more artillery than he can bring to bear. But in another respect it is a sharp break with tradition, the old British sea-dog tradition of getting close to an enemy and slugging it out. It represents the development of a new hit-and-get-away policy of tactics, beautifully adapted to make things unsafe for the Italians in the Eastern Mediterranean quadrangle, for the Germans in the wet triangle between Denmark, Norway, and Scotland, and for the Japanese along the China coast routes. This policy seems designed specifically to counter the operation of Axis light craft, to strike them down before they get fairly to sea by throwing against them British light craft both more numerous and more efficient. In short, it looks as though England were planning to revive against the Axis the old institution of close blockade, unknown since the American Civil War.

The system would be something like this: British light cruisers would work close to the enemy's harbours, protected against attack from the air by their own anti-aircraft guns (British ships have more of them than any in Europe), by smokes, by speed, and the supporting aircraft from their own carriers. It would be next to impossible to sift raiders through such a net. Only the

mass excursion of a fleet would break it, and even then the tatters would keep to the skirts of that fleet till the new British battleships, capable of operating long distances at high speeds, came up along the interior line of the sea.

This new British strategy, if successful, would vitiate the Axis plan to separate British fleets. It would restore the state of affairs that existed during the Napoleonic wars.

Two dangers would threaten such a screen—torpedo and mine. The new British construction supports the idea that England believes she has found answers to both. Paravanes, the torpedo-shaped objects that tow from a ship's prow, clashing their cables against the mine's anchor cable, cutting the latter and bringing the mine to the surface, are one answer to mines. England has a high-speed type, said to be capable of operating at speeds over 30 knots. In addition her new destroyers are being fitted as high-speed minesweepers, with a new gear that will bring up mines at this same speed.

As for the torpedo, it takes a torpedo carrier. What is to carry torpedoes against the new British light ships? Submarines? England is known to have an anti-submarine device, developed at the submarine school at Portland, the great technical secret of the British Navy as the bomb-sight is the great technical secret of our own. It will, it is claimed, reveal the location of a submarine more than a mile distant and under water, even at night, even when the submarine is not moving, lying on the bottom, perfectly immobile. Wartime conditions always deduct something from such enthusiastic predictions, but the device need only be 25 per cent efficient to achieve complete success. When the World War Allies rendered it certain that only one German submarine

out of every five would not return, the morale of their crews began to go to pieces, they became incompetent.

Are the torpedoes, then, to be carried by M.A.S.? Britain has three possible answers—one defensive, the new high-speed artillery, firing barrage, the splash and burst of which is heavy enough, even though they miss, to upset an M.A.S.; the other two counter-offensive—aircraft firing small cannon, against which the defence of the M.A.S. is very weak—and the M.T.Bs. These last are a British version of the M.A.S., torpedo motor-boats as fast as the Italian, but bigger, armed with light guns, more powerful and more seaworthy, so they can go almost anywhere in European waters.

Will light torpedo boats and destroyers be the carriers? England's own destroyers are now divided into two types. One, a development of the conventional destroyer design, with the tonnage up to 1,650 to meet the big boats of the Continent, uses the torpedo as the first and deadliest weapon—mounts ten tubes for this purpose, more than any Axis destroyer afloat, and carries besides an armament of six 4·7-inch guns.

The second type consists of the remarkable 'Tribals', a developed throw-back to the days when the destroyer was really supposed to destroy torpedo boats and not to be a big torpedo boat herself. In this class, of which sixteen are now ready and more building, the torpedo armament has been reduced to four tubes, but the gun armament pushed up to eight 4·7-inch. On trials *Ashanti* of this class recently turned out ninety-six shells in less than two minutes—firing so fast that two full broadsides, sixteen shells, were in the air at once.

A fleet protected by such elements is unlikely to be driven off by anything torpedo-carriers can do, and is in a good position to take the counter-offensive against

any movement of light ships, assisted by the new British submarines, boats distinguished by small size and the ability to make very rapid, very deep dives.

It is quite on the cards that as these new British vessels join the fleet, as officers and men become experienced in the new tactics these ships were designed to carry out, Malta may be repossessed as an effective base. Not as a station for the battle-fleet—those days are gone, unless the Italian air power should be knocked flat. But it could be the home port of any number of small craft; and they could terrorize the south Italian coast, stop all seaborne traffic through the Eastern Mediterranean and raid the Adriatic with effect. The same light ships could hardly reach the Baltic in a war with Germany; but they could probe deep and continuously into Heligoland Bight—an expensive, dangerous form of war for both sides. Behind them stands the British battle-fleet, now as ever, the largest in the world.

It has been predicted that German air power would drive this battle-fleet to base on Milford Haven or Belfast in the event of war. Not even this would make much difference. Given the speed of the new ships, the western bases would be nearer the German coast in running time than Jellicoe's fleet was at Scapa Flow.



X

JAPAN AND ENGLAND:

WAR IN THE MALAY STRAITS

BRITAIN'S POSITION IN EUROPEAN WATERS is, in a long war, and provided its beginning be not too far delayed, impregnable. At the beginning of such a conflict she would suffer severely, especially in the Mediterranean, where the lucrative commercial net, with all the ships then carrying it, would shrivel at a touch of the flame. There would be minor defeats, cruisers and destroyers, perhaps battleships, lost under circumstances presenting an appearance of incompetence. There would be a terrific demand for merchant tonnage as ships went down under the impact of raiders from the skies adding their blows to those of the surface and sub-surface commerce destroyers seen in the last war. There would be popular outcry, admirals and administrative officers dismissed for 'failures' merely inherent in the strategic situation.

But in the long run the weight of British metal, British grips on the vital bottlenecks of the raw materials routes that supply her enemies would fatally tell. Even Axis mastery of the air could not make the surface safe for Axis vessels; and it is by no means certain the Axis could hold effective mastery of the air. Stephen Th. Possony, the German-Polish military mathematician, has worked out the air forces necessary for a Continental power (say, Germany) to conduct a land war and at the same time have enough aeroplanes free to conduct a really paralysing offensive against British military establishments and commercial lines. It comes out at nearly 200,000 planes, with something like 10,000 replacements needed

every month. The figure seems altogether beyond the capacity of German industry, not to mention that every lost 'plane would mean a lost pilot, and no country could find 10,000 new aeroplane pilots a month.

But the Axis is a tripod; England's weakness lies in the East. At present she can muster for the defence of all her island and inland possessions beyond Suez, including the dominions of Australia and India, a fleet which consists only of two aircraft-carriers, seven heavy cruisers, three light cruisers of the first class and six of the second, ten destroyers, sixteen gunboats and fifteen submarines. Light forces, and what is worse, scattered light forces. In a general war they could do little but annoy the Japanese fleet.

It is true that Japanese commerce is peculiarly vulnerable because peculiarly important to Japan. The Rising-Sun Empire is as much of a poorhouse as Italy in the essential raw materials of mechanical war—short on iron, desperately short of petroleum, utterly lacking in lead, copper, aluminium, rubber, cotton, nickel, wool, all of them products that must reach her by sea. But it is also true that few of these products come from British sources which would be automatically closed to Japan in war.

Japan already obtains 90 per cent of her iron, 65 per cent of her petroleum, 95 per cent of her copper, 45 per cent of her lead, 90 per cent of her aluminium, nearly 100 per cent of her cotton, from the United States. She could get wool there or from South America in a pinch. The trans-Pacific route, running as it does, high against the curve of the Alaskan islands, would be subject to British interruption only from a fleet based on Esquimaux in Western Canada. It would take months to establish a British fleet there. In fact, it might not be

possible to base there at all. Esquimault has no docks that would take a damaged battleship or even a big cruiser. A British fleet that fought a battle in the North Pacific would die of its injuries, even if victorious.

From the characteristics of its ships, from their distribution, it is apparent that the British Navy has never contemplated any such action. England has no means of taking any action in the wide belt of ocean sweeping from Canada to China, the only similar section of sea in the world that is without British possessions or bases. British strategy as against Japan is outlined by geography as a thrust north along the China coast into the Yellow Sea, which already carries nearly half Japan's seaborne trade and makes the connexion with the establishments on the Asiatic mainland.

Hong Kong is the advanced base for such a thrust. It lies under the threat of Japanese air power based on Formosa; it is 1,500 miles steaming distance from the nearest heavy British support at Singapore, and in a war where Britain was forced to take the defensive in the East would probably not last long. But with England on attack the situation is reversed. Hong Kong dominates Formosa, itself so far from the nearest Japanese fleet base at Sasebo as to be beyond good flying range, and to make it necessary for a battle-fleet from the north to refuel before fighting an action off the island.

The geography of the China coast thus favours the offensive, into whosoever hands it falls, which is the reason why the enthusiastic Japanese naval building of the 'twenties excited no particular alarm in England. It was clear even then that Japan meant mischief on the mainland; it became still clearer after the Manchukuo business. But at that time England's European naval responsibilities were still light, the Fascist air power

had not yet shown its teeth. The largest navy in the world could be used to canalize Japanese Asiatic effort northward against the frontier with Russia.

The decline of French land power, the break-up of the League of Nations and the French system of alliances in Europe, the rise of the Italian air force and the renaissance of the German Navy, rushed on too fast for English building, both of ships and bases, to catch up. In a sense the first combat of to-morrow's war has already been fought, and the Axis has been successful through its strategy of diversion and simultaneous attack. As a result the Japanese fleet has been left free of hindrance to blockade China and to support the army operating there.

It is not necessary to suppose a secret formal alliance between Japan and the European Axis powers, though such a document may exist. It is necessary only to realize that England has lost her power of taking the offensive in the East, which has been transferred to Japan. While this condition exists England will be forced to an unending series of concessions and withdrawals.

For war, with a Japanese offensive in the South Seas, could be nearly as dangerous to England as an English offensive farther north would be to Japan. Japan holds the mandated islands north of New Guinea. There are known to be at least five good bases for light ships and aircraft there; possibly there are bases for heavy ships as well. From these bases Japanese cruisers could destructively raid the traffic of Australia and New Zealand while from Formosa and the Chinese establishments, Japanese heavy fleets could effectively close both the Straits of Sunda and the Malay Straits to British use.

II

The Japanese fleet is perfectly adapted to such employment; so perfectly that it may be said to have been constructed with such a strategy in mind. In its main battle line are ten ships: two (*Mutu*, *Nagato*) with eight 16-inch guns apiece; four (the four *Husos*) with twelve 14-inch, and four battle-cruisers (the *Kongos*) with eight 14-inch. Their most striking appearance features are the enormous towers that rise round their foremasts, piled mountain high with bridges and cupolas. In a military sense their most striking features are the good protection, long cruising range, and high speed. Only the Italian battle-fleet exceeds the Japanese in tactical speed—that is, the speed at which the whole group can move in the presence of an enemy—and in strategic speed, the time it would take to move from Sasebo to Sydney (for instance) they outmatch any fleet in the world.

For the strategic speed of a big fleet in a wide ocean is not determined by that of the warships, but by the power of movement possessed by the train, the accompanying hospital ships, repair ships, 'beef boats', and, above all, the tankers. Tankers are normally slow craft. The British Navy, for example, has none that will do more than 12 knots. Japan has a dozen or more, either built under subsidy by private firms, or directly by the navy, that will go 17, 18, 19, 20 knots for days. There are enough of them, in fact, so that the whole Japanese fleet can now go clear round the world at high speed without ever visiting port.

They are just what Japan needs to conduct a successful offensive against British possessions, either around the Malay Straits or the eastern side of Australia. From Sasebo to Singapore is about 2,700 miles steaming, or

nearly as far as it is across the Atlantic. From Jaluit, the most southerly of the Japanese mandated bases, to Sydney, it is even farther.

To accompany the battleships Japan has four big aircraft-carriers, not remarkable ships in any way, and three small carriers whose shallow draft and smaller equipment of 'planes indicate they were designed particularly for operations off the Chinese coast. There are said to be more small carriers building. In a British war these ships would be South Sea commerce-raiders.

The Japanese Navy counts twelve heavy cruisers, though four of them are the *Kakos* mentioned in Chapter III, with only six big guns each. All eight others are built on raiding lines; in a campaign they would overmatch the seven heavy cruisers England keeps in the East, being better ship for ship, and doubly better by being 12 to 7, cancelling that superiority of numbers which the English naval system requires.

This is not all. Like Russia, Japan has been extraordinarily successful in keeping her naval building a secret. Her shipyards are cities of silence, surrounded by high walls and charged wire, from which no workman ever emerges, into which no foreigner ever goes. There have been persistent reports that behind this curtain of secrecy Japan is building two or more ships of a new type—raiding cruisers on a tonnage of about 15,000, super-*Deutschlands* of high speed, armed with 12-inch artillery and supplied with numerous aeroplanes. American naval officers are almost unanimous in doubting these reports. They point out that such ships would be extremely expensive both to build and to operate; that they would be practically useless in the battle line; that they would be of small help in obtaining that command of the sea by the big fighting fleet which is demanded by the classic

sea-power concepts of Mahan; that with the same expenditure of time and money Japanese builders could turn out battleships to win the full command of the seas.

But everything goes to show that the Axis powers are rejecting the classic doctrine in favour of a new technique of winning sea power by a strategy of diversion, division, and local victories leading up to the final grand smash. There could be few better ships for such a purpose than these theoretical 15,000-tonners. They are expensive, but it would take a still more expensive battleship of the first class to handle each of them and perhaps more than one battleship if the operation of finding the raiders be taken into consideration. It should also be noted that Japan is the one Axis power that can really use such ships. Germany or Italy would run too many chances of losing such vessels in the issues of the narrow waters by which these nations are contained, but Japan's long frontage on the Pacific guarantees access to the open sea in all cases save the hopeless one of utter defeat of her battle-fleet followed by a close blockade.

The construction of Japanese super-cruisers, then, while not altogether certain, is perfectly in line with the general trend of Axis strategy and naval ideas. It is more probable than not.

Japan has twenty-four light cruisers of various ages, types, and sizes. All but the latest class of six ships are so lightly armed and armoured as to be marked for duty with the fleet as scouts and flotilla cruisers. This latest class consists of the *Mogamis*, to which the English *Southamptons* are replies. The first four of the class were built with fifteen 6-inch guns. There are supposed to be more light cruisers building, lighter armed ships on 7,000 tons, of great range; the number is a mystery.

There are two striking characteristics of the Japanese

flotilla craft: the number and gun-power of the destroyers; the number and size of the submarines. There are 112 of the former with an unknown number building—more in proportion to the capital ship strength than in any navy but Britain's. Most of them carry the extraordinarily heavy armament of six 5-inch guns.

Now the great British destroyer strength is based on the necessity of using these ships on anti-submarine convoy and patrol work in the narrow waters of Europe. To a certain extent this is true of the Japanese also. They must always reckon with the great and growing Russian submarine flotillas at Vladivostok. But Japan has a great quantity of sub-chasers and small torpedo boats for this type of duty. The prodigious gun-power of her destroyers has no meaning if they are to be used against submarines. In Japanese manoeuvres, as a matter of fact, these destroyers work with the fleet, not on separate patrol units. The conclusion appears inescapable that the Japanese system of tactics looks forward to violent torpedo attacks before, during, and after any fleet action. It is a method with which the Japanese had much success during the Russian war, and, moreover, it is one peculiarly suited to the self-sacrificing, courageous temperament of Nippon.

As to the submarines, the smallest Japanese class, the *Ros*, twenty-four in number, would be rated medium submarines by any other nation. They run to about 800 tons (surface) displacement apiece and have cruising ranges up to 10,000 miles. The Japanese 'middle' submarines, twenty-eight of them, are 1,200 tons and up. They could cruise to the Panama Canal, or, more probably, to the southern tip of Australia without refuelling, particularly if they started from Jaluit or Ponape in the islands. Above these are eight (with more

building?) giant submarine cruisers, rivalling surface cruisers in size, several of them carrying aeroplanes. The waters of the South Pacific, where they would operate, are too deep to be closed off with mines, are full of little atolls where they could make their headquarters.

III

This Japanese fleet is thus in no shape to meet the full English Navy in battle or otherwise to challenge it for command of the sea. But its construction, organization, and training are based on the idea that it need never make such a challenge; that it need only face what ships England can spare from the European situation. At present it is perfectly capable of holding those seas against England, cutting off English traffic to Australia, raiding the Indian Ocean, and assuring Japanese supply lines across the Pacific and to the south.

For many years to come the safety of these supply lines is all Japan wants or asks; the rest is her threat if they are disturbed. She is occupied with the conquest of China, desires only to complete that operation in security, and if allowed to do it without hindrance, would immediately become an unstable partner of the Axis.

But the conquest of China involves the liquidation of England's interests there, and England cannot afford to consent to it. The reasons why she cannot fall outside the scope of this study and are extremely complex. Basically, they are both financial and psychological; the loss of the pounds sterling in Chinese investments would bring about something like a national money panic in England, and the loss of 'face' involved in such an abandonment would probably make England's hold on India insecure. And India is the Empire, the key piece.

The reasons do not matter. The central fact with

relation to to-morrow's war is that England cannot and will not withdraw from China. She has retreated there and will retreat farther; it is to gain time, while the new fleet, destined for Eastern service, is building. The ten *Southamptons* are ready now; as soon as the *Fijis* are completed they will doubtless all be moved from Europe to the East. Three lighter cruisers have been transferred to the Australian Navy, the Dominion is improving its dockyards and talking of building ships of its own, work on the Singapore fortifications has been pushed on till it is now one of the four strongest sea-fortresses of the world. (The others are Heligoland, Pearl Harbour, Gibraltar.) Most important of all are the four new battleships England has laid down since the *King George V* class—the *Lions*, 45,000 tons each, with 16-inch guns, specifically designed against Japan.

They will outmatch any ships in the Japanese Navy; indeed the four together would be a fairish bet against the entire Japanese battle line. But it will take four years to build them, and even complete they will only be the first step on a long and dolorous road. For Japan is building too; the best information is that she is working on three ships almost if not quite the equal of the *Lions*. In other words, the simultaneous challenge of the three Axis powers has laid upon England the burden of building a second British Navy, nearly as large as the first. Just as she can face Japan at present with only a small portion of her fleet, so she can build against the Rising Sun with only a small portion of her building yards. For the time being she is meeting the strain well. But over the long route, when the enormous expenditures begin to tell on her general economic structure, it is by no means so certain. Here as elsewhere, time works in favour of the Axis.

IV

The islands from the Malay Peninsula to Australia throw a barrier across Japan's advance to the south. It is pierced by gaps—the Malay Strait; the Straits of Sunda, the Timor Sea, and Torres Strait—a series of those bottlenecks along which English strategy always likes to build its defensive lines. A Japanese fleet can avoid these passes only by a long cruise round the continental bulk of Australia, impossible against an enemy of anywhere near equal force; impossible even to isolated raiders unless they drag supply-ships in their train.

To reach the Bay of Bengal, where they could do England the most harm, Japanese ships must, then, run the gauntlet of the straits. Should politics or mechanical science bring the British Eastern fleet up to Japanese strength, they could hardly hope to win through. What then?

Japanese strategy has already foreseen such an eventuality and has planned to short-circuit Singapore. The last three or four years have seen naval building all over the world on the intensive scale of a race; but of all the nations, that which has made the greatest proportionate increase in naval armaments is—Siam.

In 1930 the Siamese Navy consisted of one worn-out, war-built destroyer, bought from England, and two gun-boats with two guns apiece. To-day Siam has eight torpedo motor-boats, two big minelayers, three anti-aircraft vessels, four modern submarines, eleven fast new torpedo boats, and four heavy, armoured coast defence cruisers, of which two mount 8-inch guns. Two more anti-aircraft ships and two powerful light cruisers are building. All these ships but two were built either in

Italy or in Japan. A Japanese naval mission is permanently installed at Bangkok; the gentle Siamese, devoted to posture dancing and the culture of white elephants, are learning to shoot and to run torpedo attacks at speed, in accordance with the Japanese system of tactics.

Whether the Siamese would be much use in a dress-shirt war is uncertain, but this is not the point. The point is that Siam owns the Isthmus of Kra, where a cut less than twenty miles in length would shoot ships direct from the China Sea into the Bay of Bengal at six hundred miles distance from Singapore. The company to dig this canal has already been floated in Japan; only the financial and labour demands of the Chinese war have thus far kept the project from realization. Once the cut is made, Singapore is turned, the British defence line driven back from the straits to the coast of India itself. Once it is made also, an attack *en masse*, cost what it may, becomes the absolute indispensable first operation of an English-Japanese war, and the big naval battle to cover it is scheduled for the South China Sea. Even before the cut is made, the very number of the Siamese ships forces upon England important detachments from her fleet.

v

The safety of her supply lines during the Chinese venture is all Japan wants. Yet as she continues this venture, as she exerts pressure on England in China, these lines tend to shrivel at their source in the United States. Pressure on England in China is also pressure on America to a more limited degree, and there are violent American reactions, both emotional and commercial. In the event of Japan going a step farther to enter a war with England, the most she could count on from the

United States would be a neutrality favourable to the British, with an American embargo on essential war materials, so well supported by public opinion as to make procurements unbearably slow and difficult.

Like every other element in the situation, this has been perceived by the Japanese war-lords, who miss few tricks. They have an alternative source in the Dutch East Indies, which already supplies Nippon with her rubber, tin, fibres (except cotton), and chromite; at a pinch, these islands could be made to furnish cotton, some rice, lead, probably petroleum and aluminium—nearly the whole list of materials now imported from the United States.

'In the future,' blandly announced the Japanese representative at a recent East Indian commercial conference, 'Japan and Holland together will carry on the development of the Dutch East Indies.' The Dutch president of the gathering was so disturbed that he closed the meeting at once and reported to his home government, which laid down four big destroyers, a pair of super-destroyers on the French model, and ten cruising submarines.

For the Dutch East Indies are already heavily populated, their resources in use, nearly all the arable land under cultivation. They could be made to supply Japanese needs in raw materials, but only at the price of merciless exploitation, a process to which the present owners object.

The objection matters as little to the Japanese as similar protests from Koreans and Manchus in the past, a fact of which the Netherlands are keenly aware. They are also aware of another fact—namely, that on the day the United States cuts off the shipment of raw materials to Japan the Island Empire will be forced by necessity to seek those supplies in the Indies, the only

other place in the world where they can be obtained. Hence Holland, almost violently neutral in Europe, takes sides in the East; hence Rotterdam burghers are reaching down into their pockets to build up a navy that will be a factor in a conflict along the Timor Sea.

At present the Dutch Navy is not much of a factor. The method of enlistment has been changed and the morale is improved since the mutiny on *De Zeven Provinciën*, basically caused by race feeling between Lascar sailors and Hollanders, but it is uncertain how far the improvement has gone. In material there are three light cruisers, good of their kind, but small; two super-destroyers, heavier than European vessels of similar type, quite capable of handling any Japanese unarmoured ship; twelve destroyers, all good, and the only vessels of their type anywhere to carry an aeroplane apiece; twenty medium submarines, and ten big new submarines building. It is a fleet of light craft which would be most formidable against an enemy conducting an overseas expedition to the islands, especially when one remembers that it would be strongly supported by the excellent Dutch air force.

For if the ships of the Netherlands East Indies Navy have any common characteristic, it is this—that they are fitted to work singly or in small groups against the transports and supply-ships of such an expeditionary fleet. The Dutch submarines carry unusually heavy gun armaments. The destroyers have those aeroplanes, which would enable them to hide out in jungle inlets or atolls, waiting the right moment for a dash. The cruisers, though not large, are well enough armoured to break through a screen and raid any convoy guarded by ships less powerful than heavy cruisers.

In itself this fleet could not accomplish a great deal;

co-operating with the British Navy against Japan it could accomplish much. Meanwhile the Dutch are talking of building three battleships themselves. It probably does not mean much; granted the promptitude of their nation they will get them completed about the time to-morrow's war comes to an end.

VI

The Japanese position in the South-west Pacific is thus strategically very sound while she holds to the Axis. There are, nevertheless, four weaknesses.

The first is in construction. The country is poor and must import its iron at considerable cost. Thus, as soon as Japan began to build her own warships instead of buying tailor-made vessels abroad, her designers turned their attention to the problem of getting the same fighting efficiency out of vessels of lesser tonnage—that is, ships that did not use up so much expensive steel.

One of the obvious ways was to cut down on quarters, headroom, and accommodations for the crew. Long ago Japanese naval men discovered their sailors could live and work under physical conditions that would paralyse the efficiency of Occidentals. This characteristic has been exploited to the utmost. Most of the new cruisers and battleships have the living-quarters above deck in those singular towers, and Japanese officers have not as much space or comforts as an American enlisted man.

Another way of saving weight is simply to pile more guns on to smaller ships. This also the Japanese have tried. It worked, or seemed to work, very well for a time, the process reaching its climax when the Japanese designers managed to squeeze the full armament of a 900-ton destroyer on to the 527-ton torpedo boats of the *Tomodzuru* class.

But when *Tomodzuru* put to sea for trials in 1934, there was another tune to sing; the first time a swell hit her she turned over and floated bottom up, with the crew underneath. Foreign naval observers are convinced that this defect, in one form or another, runs all through the Japanese Navy, for all their ships have heavy topweights and low freeboard. It is not impossible that when they are hit by a few big shells that cause leaks and loss of stability, more of them will capsize. In other words, the Japanese ships have gained their enormously heavy armaments at the cost of safety factors.

Enormous amounts of weight may also be saved by the use of welding instead of rivets. Every navy has tried this to some extent, especially on interior fittings that do not have to bear heavy strains. But the Japanese boldly went the limit in the first cruisers of the *Mogami* class, welding the exterior plates along the water-line. It seemed all right while the ships were running their engine-trials; but when *Mogami* fired her gun-trials, the shock of fifteen 6-inch guns letting go at once proved too much for the welded joints. They opened up, water rushed in to mix with the oil in her bunkers, and she had to be towed home.

Experiments with other ships of the class showed that the defect was inherent in the welded design. They simply carried too many guns for this type of hull to support against the stress of battle-firing. As a result these ships have given the Japanese Admiralty endless trouble, for it is impossible to put them back into dock and substitute rivets for the welding; the weights would be so much increased that their freeboard would be dangerously low, the ships dangerously top-heavy. The latest report is that two of the ships have had one turret each removed, making them twelve-gun vessels instead

of fifteen; that the last two have been re-designed as twelve-gun ships while construction is still incomplete, and the first pair were patched up somehow or anyhow.

The whole story is typical. The Japanese are extremely ingenious at thinking up clever tricks, but the ocean, an institution without a psychology, persistently refuses to be tricked.

The second great Japanese weakness is in the air. They can neither make good aeroplanes nor fly them well, in spite of the most heroic efforts. The difficulties they experience in aeroplane construction are illustrated by the story of the Japanese Navy's big patrol flying boat, launched with such a blowing of trumpets four years back. Commissions were sent abroad to study the flying boats of other navies and nations. They reported that indubitably the best hull form was that of the British Short; that the Germans had achieved something really exceptional in their new 'zenonia' wing shape; and the American Pratt & Whitney motors were without doubt the best in the world. Japanese builders accordingly copied the Short hull, attached to it a pair of German type wings, and mounted a home-made copy of the Pratt & Whitney motor atop. They are still wondering why the combination did not give them world-record performance.

The question of the flyers is somewhat more difficult. Every observer concurs in the opinion that the Japanese are daring but incompetent aviators; hardly any two agree on the reason. Four main theories have been advanced, explaining it on (a) medical, (b) religious, (c) psychological, and (d) educational grounds.

According to the first postulate the Japanese as a race, have defects of the tubes of the inner ear, just as they are generally myopic. This gives them a defective sense

of balance, the one physical sense in which an aviator is not permitted to be deficient.

The second explanation places the blame on Bushido and the Japanese code that the individual life is valueless. Therefore, when the 'plane gets into a spin or some other trouble, they are apt to fold their hands across their stomachs and die cheerfully for the glory of the Empire, where Westerners, with a keener sense of personal existence, make every effort to get the 'plane out of trouble, or bail out at the last minute. This explanation has been advanced by several aviation instructors who have been in Japan.

The psychological theory points out that the Japanese, even more than the Germans, are a people of combination. 'Nothing is much stupider than one Japanese, and nothing much brighter than two.' But the aviator is peculiarly alone, and the Japanese, poor individualists, are thus poor aviators.

Finally, the educational explanation points out that Japanese children receive fewer mechanical toys and less mechanical training than those of any other race.

Whichever be true, the Japanese remain poor aviators. At the last peacetime manœuvres, when three carriers operated with the fleet, they lost seventeen aeroplanes and their crews by accident. They courageously proclaimed their intention of continuing and losing seventeen more daily, if necessary, till Japan had conquered the air. But it will take more than courage and persistence for Japan to do it.

The third of the great Japanese weaknesses is psychological. They lose their temper; not only on the small scale, where it is a matter of slapping one man's face, but also on the large scale, over periods of time, in the conduct of great operations. And when they lose their

temper they lash out blindly, forgetting the possible cost.

An instance of this occurred during the Port Arthur operations in the Russian War. The defence of the famous 203-Metre Hill proved unexpectedly obstinate and irritating. There was no strategic reason why the operation had to be hurried. The Russian fleet in Port Arthur was already crippled, the Russian Baltic Squadron had no more than begun its melancholy odyssey. But the Japanese high command became annoyed and flung men in frontal attacks at the deadly hill till it fell, at the cost of thousands of lives.

Naturally, foreign general staffs are fully aware of this characteristic. Naturally any war with Japan would be, in the hands of an intelligent general staff, a campaign to provoke the maximum of Nipponese irritations, unto the day when the Japanese fleet would come down and fight matters to a finish regardless of odds. The British understand both steps—preliminary irritation and the subsequent ding-dong battle—peculiarly well.

None of these compare in importance with the fourth weakness. Japan dares provoke or enter no war in which the United States fleet will be engaged on the opposite side.



XI

COLUMBIA, THE GEM OF THE OCEAN

ONE FACT OF SEA POWER is fundamental, influencing all naval and diplomatic calculations throughout the world: no navy in existence, hardly any two, can bear the weight of the United States fleet.

That fleet has its defects, to be sure. The battle line is the slowest there is; it cannot force an unwilling enemy to fight, and once engaged, it cannot break off action for an escape. Some of the battleships steer badly. The earlier numbers of the heavy cruiser class have several weaknesses of design, poor turning circles; they roll prodigiously in a seaway and vibrate badly at high speeds. Three at least suffered from cracked stern-posts. The broadside fire of the ten light cruisers of the *Omaha* class is weak and the gunners are poorly protected. A number of the new destroyers had to be put into dock for major readjustments as soon as they left the builders' hands, and the below-decks space on many is so clumsily arranged as to make minor repairs difficult. There has been constant trouble with the Diesel motors of the big submarines, some requiring entirely new power plants.

American admirals are older, as a class, than those of any other nation. Nelson, Hawke, Drake, Togo, Blake, Suffren, Rodney—almost all the great admirals of history, were at the time of their greatest victories, younger than the youngest American admirals on the navy list. American admirals, as a class, spend fewer years in their rank and command than those of any other nation, have less opportunity to impress their individuality on the fleet, must perforce adopt stereotyped methods handed down by their predecessors. Promotion in the American

American Navy morale is so high that the service is frequently cited as one of the two model military establishments of the world (the other is the French Army). No navy attracts so intelligent a class of enlistments or has so high a level of technical skill in every department.

Most important of all, the tradition of the American Navy is thoroughly a tradition of the offensive, of seeking out the enemy wherever he may be and fighting him. To a weak service this might not be altogether an advantage, or to one whose individual ships were strikingly inferior in fighting power to the individual ships of a possible enemy. But ever since the golden days of 1812, when the heavy frigates of the then nascent American Republic slaughtered their lighter British opponents, the building tradition of the U.S. fleet has been in the direction of mounting the heaviest possible gun on the largest possible ship behind the best possible protection. Speed is merely a desirable quality to an American officer; armament and armour are necessities.

There is necessary at this point a distinction between the American tradition and the British, which is also one of action, of attacking the enemy under all circumstances. The guiding principle of the British Navy has always been expressed in the words of Nelson: 'That captain cannot go far wrong who places his ship alongside the enemy.' That basic doctrine still holds good, as Jutland showed. There was nothing but praise for the courage of Admirals Arbuthnot and Hood, though they brought their ships into action so maladroitly as to lose their lives and vessels. It is hard to believe that they would have received such praise had they been officers in the American Navy, whose tradition of the offensive is also a tradition of manœuvre, of tactical study, almost of intellectualism.

This is shown in another way. British officers write books of chatty memoirs after retirement, full of good anecdotes and duck-shooting in China. American officers, while still junior, write profound studies on tactics, strategy, history, or logistics, in the hope of advancing their professional standing. No military service of the world has produced more literature than the American Navy, or of such uniformly high quality.

It is this wedding of great force with great intelligence that renders the American Navy formidable.

II

The greatest part of the American Navy's force is concentrated in the present battle line of twelve ships, seven of which have been 'refitted', a word which, in this connexion, means a practical reconstruction from the hull up. The oldest of the twelve are the two *Nevadas*, built well before Jutland, but after the firing experiments on the old Spanish War *Texas*. They embody the lessons which naval men agreed to draw from both battle and experiments. Briefly these were that heavy armour was much more useful, more resistant to shell-fire, than proving ground experiments gave reason to believe; but that medium and light armour were worse than useless, disintegrating under impact into huge steel splinters that went singing through the ship with deadly effect.

Nevada accordingly became the first 'all or nothing' ship, in which the armour was either of the very heaviest kind or non-existent. Not even the British *Queen Elizabeths*, much later ships, have so stout a belt as *Nevada's* 13½ inches, or such turret protection as her 16- to 18-inch plates. *Nevada* and her sister, *Oklahoma*, mount ten 14-inch guns, but both steer badly and roll badly since their reconstruction. Their internal and handling

machinery is wearing down and is of a type now superseded by more efficient designs. When new ships come from the yards they are due for retirement from the battle line.

The next seven ships—two *Pennsylvanias*, three *Idahos*, two *Californias*—are sisters as far as armour, guns, and speed go, all having 14-inch belts, twelve 14-inch guns in four triple turrets, and 21 knots of speed. Reconstruction of the *Pennsylvanias* and *Idahos* has greatly changed their appearances. The first pair have been given tripod masts, the latter three a skyscraper structure of bridges instead of the peach-baskets that used to be characteristic of all American battleships. (Incidentally, there was nothing wrong with these peach-baskets; modern director fire-control merely demands such a structure of bridges and control-rooms that it was no longer worth while to build them.) Internally, both classes have received new boilers and double-armoured decks against bombing aircraft.

The *Californias* are more efficient ships by reason of their electric drive, which gives them better cruising qualities. Beyond them, built to practically the same design, but with eight 16-inch guns substituted for the twelve 14's, are the 'big three'—*Colorado*, *Maryland*, *West Virginia*.

This matter of the big gun calibres is important—why change, when it means cutting the total number of guns from twelve to eight? Particularly since at the long ranges at which sea battles are fought these days the fire from the most carefully calibrated guns spreads so far that only a few shells of a salvo can be expected to hit.

In actual weight of broadside there is no difference between that of a twelve-gun 14-inch ship and an eight-gun 16-inch ship. The American 14-inch fires a 1,400-pound shell, the 16-inch a 2,100-pound shell. Each ship

thus fires a total of 16,800 pounds per broadside. But the 16-inch, a heavier shell, fired with a larger charge of propellant, arrives with greater speed and thus can penetrate a greater thickness of armour. Moreover, the thickness of the shell itself, the metal case that contains the bursting charge, is practically the same in a 16-inch shell as in a 14-inch. The contents, the bursting charge, is the portion that increases with increasing size; and as the object under consideration is roughly cylindrical and we are dealing with explosives, the bursting charge thus increases relative to the square of the weight of the shell.

Square the weight of a 14-inch shell—1,400 pounds—and one gets a reference figure of 1,960,000. Square the 2,100 pounds of a 16-inch shell and the comparative reference figure is 4,410,000. Twelve 14-inch thus give a total punch (expressed in reference figures) of 23,520,000; eight 16-inch similarly yield 35,280,000. Thus *Colorado's* battery is superior to *California's* by nearly three to two—not quite, for one must make allowance for the greater number of hits *California* will obtain from her larger salvoes.

Well then, why not jump to the 18-inch gun, which would be as much superior to the 16-inch as the latter is to the 14? Because a host of new problems is now introduced. If the effect of the shell jumps as the square of its weight, so does the weight of the gun itself, the mounting, the handling machinery, and the great cylinders that take up the recoil of firing. The jump from 14 to 16 inches in calibre, from *California* to *Colorado*, already necessitates the suppression of one gun per turret. To put the calibre up another two inches would probably require suppressing another gun per turret, and leave us with a four-gun ship, which gives a Hobson's choice between one-gun turrets, or, costly and

inefficient construction, or two-gun salvos, not enough to achieve effective ranging. An 18-inch gun, because of the huge charges necessary to carry the shell down its long barrel, would wear out terribly fast under the heat and pressure. Finally, the ship itself would have to be built much stouter to withstand the immensely greater explosion. A salvo on *Colorado* drives her straight sideways for two feet in the water, though she is steaming full speed ahead while firing.

Build a bigger ship, then? But a ship that carried 18-inch guns would have to be bigger in beam rather than length to stand the shock of her firing. The 33,000-ton *Colorados* are already as wide as it is permitted for American battleships to be; that is, just wide enough to squeeze through the Panama Canal. A much bigger ship would, besides, have difficulty in finding docks where she could repair.

Thus, in spite of rumours that the new Japanese ships might be planned for 18-inch artillery, the American Navy's new ships are to be armed with 16-inch. There is, no doubt, a shadow of future trouble here, even if the present rumours be untrue. Japan, with her many wide and deep harbours, would have less difficulty than the United States in maintaining 60,000-ton 18-inch gun ships, and Japan has no canal they must go through.

Yet the danger is remote; rumour is pretty clearly a liar in this instance. In building against the United States under present conditions Japan faces a stern chase as hopeless as that of Germany in building against England. Consideration of the present Japanese Navy list confirms the verdict of the nation's newspapers and diplomatic manoeuvres. Japan is not ready to fight the United States on the sea. Her fleet lacks both power and cruising range for trans-Pacific operations; she could

conduct nothing but a *guerre de course* off our Pacific coast.

To attain strength for a full-fledged campaign against the United States, Japan must gain ships from one of three sources: by capture, as the result of a sensational and unlikely victory over England; by alliance, obtaining the support of the other Axis powers for a campaign that would force the American Navy to fight on both coasts at once; or by construction, outbuilding the American Navy's battle line. The last of these at least is unlikely while the present building programme continues.

That programme was initiated by the six *North Carolinas* (*Washington, Alabama, Massachusetts, South Dakota, Indiana*, beside the name ship of the class), the most battle-worthy of all the post-treaty 35,000-tonners. As usual with American ships, they are designed for lower speeds than European contemporaries—27 knots officially, though the unofficial hope that they will do thirty with the new high-pressure boiler installations will probably be realized. As usual, they are prodigiously carapaced in steel—16 to 18 inches of belt armour, according to unofficial figures, with 10 inches of armoured decks, the heaviest ever built into any ships. As usual, they lead the world in gun-power for ships of their class, mounting nine 16-inch in three triple turrets. They will not be complete till nearly four years have gone; but at that time they will more than double the strength of the American battle line and in themselves outmatch any European navy but Britain's.

III

But it is not certain they will outmatch Japan, the nation America must consider before any other. For the fact that Japan does not wish to fight the United States

(at present) is, unfortunately, no more than a pleasant thought. Japan's campaign in China, as we have seen, has brought her into irreducible antagonism to the British Empire, and the British Empire is not only England, to which Americans are emotionally, culturally, diplomatically, and commercially attached. The British Empire is also Canada; and in terms of the lowest common denominator of national self-interest, we must defend Canada whether we like it or not. It is impossible to see the United States staying out of a Pacific war which Britain stood in serious danger of losing. Not to mention that as versus Japan, America's own interests in the Orient are identical with England's.

When the Washington Treaty ran out in the hours while storm-clouds were already gathering over Europe, Japan refused to sign a new one on any basis but the intolerable one of a 'common upper limit', which would leave the Japanese masters of the South Seas, the Philippines, and the coast of Australia. The other parties to the Washington instrument, and Germany, which was not a party, stayed within the 35,000-ton limit for the new ships laid down then, hoping to impose upon Japan disarmament by example. The plan worked as well as disarmament by example usually does; that is, Japan disregarded it and laid down the two or three ships that are, by the best information, about 42,000 tons each. In 1939 the United States accordingly invoked the escalator clause in the treaty, and authorized the battle-ships *Iowa* and *New Jersey*, 45,000 tons each.

They represent an entirely new departure in strategic ideas as well as in construction; or better, they are the culminating point in the development of an idea that has been vaguely afloat ever since the launch of the first heavy cruiser. This type of vessel, it will be recalled,

came on the scene at about the same time the aircraft-carrier developed out of its World War swaddling clothes into a full-fledged partner in the fleet.

The idea of combining the two types of ship in a force with special duties was a natural one in the American Navy, where neither could make more than a limited use of its great speed while operating with the slow U.S. battleships. Thus there arose the concept of the 'carrier striking force', the only new idea in naval strategy since the battle of Jutland if one except the diversion and dispersion grand strategy which seems to underlie the arrangements of the Berlin-Rome-Tokyo Axis.

The carrier striking force plan calls for the brigading together of a carrier and one or more heavy cruisers as a semi-independent force. In fleet operations it would be the duty of this force to swing round the flanks of an enemy fleet and fall on its carriers with gun and bomb, the carrier of the striking force ensuring secrecy to the operation by using her own flights of 'planes. Operating independently, such a force would be used against convoys; its power is such that the convoying power would be forced either to cover big convoys with detachments from its main battle-fleet or to break them up into wasteful small units. The striking force could raid a coast, causing panic among civilian populations and a stoppage of industrial production even some distance inland; and by the same means could greatly increase the popular pressure for local protection with which every naval general staff must reckon in time of war. It could even attack a base unless the latter were provided with the most powerful kind of defences.

It is noteworthy that the 15,000-tonners with 12-inch guns which Japan is supposed to be building and the small carriers she is known to be building, would make

particularly good striking force units. In the meanwhile, the United States, with the most numerous and best heavy cruisers, the largest, fastest carriers (including *Lexington* and *Saratoga*, which have eight 8-inch guns apiece and are practically striking forces in themselves), is peculiarly well equipped for this type of operation. The United States, in fact, is in the happy position of being able to turn round on the Axis its own strategy of diversion, with the advantage that the main fleet behind the striking force would be delighted to meet the enemy in battle at any time.

But if a striking force based on heavy cruisers is a powerful weapon, some American naval men have argued, one wielding the huge guns of battleships would be more powerful still. It need fear nothing, run from nothing. Not even an enemy battle-fleet could approach it without running the chance of injuries that would cause such loss to fleet speed that the slower American battleships could catch them up.

This is (apparently) the idea behind the construction of *Iowa* and *New Jersey*. No details of these ships have been announced but their 45,000 tons and 16-inch guns, but these permit certain deductions. The beam of American warships is fixed by the canal locks at that of the *North Carolinas*; therefore 45,000-tonners with the same beam will necessarily be much longer ships. If longer, they will be faster, for the speed of a big ship is a function of her length-beam ratio. In fact, it would not be at all surprising to see *Iowa* turn out with a speed in the neighbourhood of 33 or 34 knots, the fastest battleships in the world, able to cut down treaty cruisers.

A squadron of such ships could form a fast battle-wing of the U.S. fleet, take the head of the battle line, and in action cross the enemy's T, pouring in the deadly raking

fire that wrecks a fleet. But two ships do not make a squadron, and it will be about seven years before we have more than two *Iowas*. The coming of to-morrow's war is confidently expected before this date by a good many people. If it does come, if the two *Iowas* are ready in time for it, their great speed would be of as little use in the battle line as that of the heavy cruisers. We could expect them to be organized with a carrier as a special striking force; and as such they would create an almost insoluble problem for any opponent in Pacific or Atlantic.

IV

What carrier? Built and building the United States has seven, belonging to three well-marked types. *Lexington* and *Saratoga*, the altered battle-cruisers, are now at middle age, but are still capable of over 30 knots, still capable of carrying 120 'planes apiece. The main objection to them as striking force units is that they represent so large an investment of men, money, and power that the loss of one would be not far short of a national disaster. *Ranger* and the new *Wasp* are 14,000-ton ships of 28 or 29 knots and eighty 'planes. The drop in speed and their relatively weak armament seem to mark them as fleet carriers, designed never to stray far from the protection of battleships. In *Yorktown* and *Enterprise* the speed has been pushed back up over thirty knots, and in *Hornet*, now building, all the way up to 34 knots. All are of approximately 20,000 tons and carry as many 'planes as the *Lexington* class.

Recent years have also seen a change in the character of carrier-aircraft in the U.S. fleet. The observation and pursuit 'planes, formerly so numerous, have all been replaced by bombers and torpedo-carriers. In one direction this means that the fleet air arm has reached

the full status of adulthood; has taken its place in the general tactical set-up by the side of the destroyer or cruiser force as a department of the fleet with its own special mission. What is this mission?

In the case of the American fleet which is, and will remain until the battle line is, entirely made up of ships as fast as *Iowa*—some twenty-five years in the future—there can be comparatively little doubt. The mission is to attack the head of a faster enemy battle line, prevent it from forging ahead and catching the leaders of the American battle line in the deadly crescent of fire that results from crossing the T. To achieve this mission it is not necessary for the aeroplanes to sink the leading battleships of an enemy. All manœuvres and experiments lead to the conclusion that they could not, even if they would, accomplish such a feat. The 'planes would rather dive against those enemy ships from behind clouds of artificial smoke, force them to turn away, expose them to raking fire on the turn, spoil their own gunnery by the manœuvre, and, above all, cut down their speed with a few well-placed bombs or torpedoes.

A few would be enough. Very fast large ships have this disadvantage—it is impossible to armour them throughout their huge length. Their bows are thus more or less unprotected. Heavily hit by bombs in this region they develop leaks, take aboard tons of water (as *Warspite* and *Lützow* did at Jutland), and though not losing their efficiency as fighting instruments, drop off rapidly in speed. The enemy could thus give no more than parallel battle; and in parallel battle the hugely armoured, powerfully gunned American line can crush any in the world.

The shift to bombers among the fleet aircraft has other implications. Formerly the fleet air force included many

squadrons of pursuit, intended to protect the ships against enemy bombers. These have disappeared; and the significance of the disappearance is that the fleet is now prepared to take care of itself against aerial attack.

As a matter of fact, no navy is better protected against such attack than ours. From the very beginning of the treaty cruiser era the American Navy has put two armoured decks into its ships instead of one. But more important than these are the nearly seven hundred anti-aircraft guns of 5-inch calibre that the United States fleet can put into action. On the trial of this gun the target was on a 2,000-foot line behind the towing aeroplane instead of the customary 1,000 feet. The first shell burst sufficiently close to the objective, which disappeared as though submitted to some process of disintegration; the towing 'plane, 2,000 feet ahead, went into a spin from which the pilot recovered only just in time to make a hectic landing. After he did land, the wings of his ship dropped off, so frightfully had it been racked by the concussion of the 5-inch shell exploding nearly half a mile away. With seven hundred such guns firing metal into the skies, even the hostile pilot who escaped being hit could expect an extremely rough ride; so rough he would not do much bombing.

v

The concentration on bombers in the fleet air force has still another implication. It is no longer necessary that observation 'planes for the fleet be carried on separate accompanying ships. All American battleships carry three 'planes. All the 10,000-ton cruisers, heavy and light, are normally equipped with four and have space for eight, the number they would take on independent

operations or distant missions. This would give them the eyes of the sea against anything but a carrier.

American designers have found an original method of bestowing these 'planes, which are carried below decks in the big square sterns visible on the 'light' cruisers of the *Brooklyn* class, the last of the treaty ships. There are nine of these; American versions of *Mogami*, but of 1,500 tons more, they have the robust protection of the 8-inch gun ships, which means they could stand up to such guns at normal battle ranges. Their speed is high enough to allow them to keep pace with destroyers, their cruising range is immense—15,000 miles, more than that of the heavies.

Their fifteen 6-inch guns have turned loose as many as 135 shots a minute on trials. This rate of fire marks them as primarily destroyer-killers, anti-flotilla cruisers. No destroyer could last long in the barrage they lay down.

Behind these cruisers are the ten older vessels of the *Omaha* class, now at the replacement stage, and either being used on detached service or with the destroyer lines. They illustrate neatly the defects that enter the American fleet through spasmodic building.

All ten were part of the great Wilson wartime naval programme. They were laid down in a hurry when naval officers finally succeeded in convincing Congress that cruisers were a necessary part of a navy, after ten years during which no ships at all had been built in the class. The design was also hurried and not clearly thought out. It comprised eight 6-inch guns placed at the angles of an oblong central structure in single-gun casemates, one gun over another.

This arrangement guaranteed that only half the ship's guns could fire in any direction and yielded the miserably

weak broadside of four 6-inch. There was so much criticism in the service that another pair of guns was mounted on each quarterdeck and forecastle while the ships were under construction. It was now too late to make the radical changes in weight distribution necessary to provide armoured turrets for these guns. As a result they are protected only by splinter-proof shields, and, to make matters still worse, it was found that the after pair of guns weighed down the stern so badly that in five of the ships one set of casemates had to be removed.

Aside from the trouble about guns, the *Omahas* are good ships; fast, with strong belt armour, mechanically sound, better ships in rough weather than their British contemporaries.

The replacements for six of these ships are now building, but will not be ready for a couple of years. These are the cruisers of the *San Juan* class, 8,000-tonners. Not many details about them have been released, but off-the-record predictions describe them as having nine 6-inch guns in three triple turrets, a good turn of speed, and a stout belt, which would make them improvements on the French *La Galissonnières*.

The United States still has over 150 of the destroyers turned out like Fords during the war when the German submarine menace was at its height. They are now growing old (small ships age faster than large) and rather light to stand up against modern competition, but they are still as they were when built, a remarkably successful design, good sea-boats, strong and well armed. They are still capable of first-class service on submarine and anti-aircraft patrol, and could even do some work with the fleet.

Of the new destroyers, built and building, there are seventy-four; the earlier numbers had defects in design

down below, but these have been cleaned up in later types. As a class the new American destroyers are marked by two characteristics: extraordinary cruising ability and, in all but the first group, remarkably heavy torpedo armament, running all the way up to sixteen tubes in some ships.

The weapon is as much the product of the tactical ideas that led to its forging as tactics are of the weapons they will use. The prodigious torpedo armament of American destroyers, plus the fact that they will be led into battle by the 15-gun *Brooklyns* probably means that American admirals have in mind a tactic of smashing through the protective screen at the head of the enemy battle line and attacking it violently with the torpedo once action is joined.

As with the attacking aeroplanes at the same spot, it is not necessary that these torpedo attacks sink many, or any ships. It is necessary only that these torpedo attacks score a hit or two somewhere among the leading ships, slowing down the line behind them, driving it into turns and bunchings. For all American tactics, all American construction in the end leads to the same object—that of bringing the enemy under the guns of the big, slow battleships, which better than any others are fitted to give and to take heavy blows.

VI

The U.S. submarine flotillas include about seventy old *O*, *R*, and *S* boats, now only useful for coast defence purposes and in such restricted waters as those of the Caribbean. There are nine more or less experimental large submarines, including one minelayer, built during the piping times of the naval treaties, and sixteen new boats, with fourteen more building.

The new American submarines are marked by relatively light armaments—only a single 3-inch gun in each, while the *Perch* class of ten ships have six tubes and the *Sargo* class of sixteen ships, eight tubes each—and relatively high surface speeds. They are big boats for submarines, in the neighbourhood of 1,400 tons each. Much of this tonnage has apparently gone into cruising radius. As a matter of fact, their radius of action is reported as extraordinary—unofficially, 12,000 miles in the P class, 15,000 miles in the later S type, enough to carry these ships across the Pacific, allow them to make a campaign on the other side, and come back.

Consideration of the submarines' other characteristics and of the general organization of the U.S. fleet would seem to indicate that these submarines are destined for no such purpose as raiders.

In American fleet organization the submarine, like everything else, plays a part in the operations of the main battle line; and the place of our submarines is far out among the scouts, where the heavy cruisers run. A big submarine makes a peculiarly good ship for such duty. She can report the approach of an enemy fleet and dive, lingering to catch any damaged ships returning from the subsequent battle.



XII

SOME ESSENTIALS OF AMERICAN STRATEGY

THE CENTRAL FACT in North Pacific strategy is this: Japan cannot hope to conduct an offensive against the American homeland until American warships are cleared from the ocean and Hawaii is taken. Our outposts among the islands—Wake, Midway, Guam (which would be so valuable as an air and submarine base, even one for a battle-fleet if equipped), the Philippines—could not hold out. All are nearer to Yokohama and Sasebo than to any American base. The lines to all are choked by the Japanese mandated islands.

But in the eastern Pacific Japan has no *points d'appui* nor can gain any short of the continent itself. Both the great base at Hawaii and the minor Alaskan bases now being strengthened flank any advance from Japan towards the United States. Even if these were not present a Japanese expeditionary force would have to travel 5,000 miles, not warships alone, but highly vulnerable transports and trains as well. Were a landing won it would have to accomplish the feat, impossible in modern war, of living off the country, or else bring supplies the same distance.

Many Japanese ships, particularly transports and those of the train, could barely make this distance even if there were no military opposition. The operating radius of the Japanese fleet (that is, the distance to which it can go, conduct a campaign, and then return) is under 2,500 miles. Therefore, Japan on attack against the United States must find an intermediate station. Geography has arranged it that only Hawaii or some Alaskan point would do.

Even the possibility of a Japanese lodgment on the

western coast of Mexico, so often mentioned in sensational newspaper articles, may be dismissed. It offers only three possible harbours (San Blas, Manzanillo, Acapulco), none of them very possible for a battle-fleet and all without dockage facilities. All are so lacking in communications with the hinterland that a foreign fleet established there would have to bring practically all its supplies over many weary miles of water, using the Mexican post only as a point of deposit. And, finally, thanks to the fact that the Mexican coast cuts in eastward, all are much farther from Japan than California itself, all are equally covered by Hawaii.

As for Hawaii, it is 2,000 miles from San Francisco, just at the limit of the campaigning radius of a big fleet; but it is 3,400 miles from Yokohama, beyond that radius. Dutch Harbour in the Aleutian Islands, the next best point for an invader to use, is within 2,000 miles of Hawaii, only 1,700 of Seattle, and 2,500 from Yokohama. It would be easy for an American fleet to support or retake; difficult to take.

In short, Hawaii controls the Pacific approaches to the United States so completely, it is so strong a fortress, so good a base for a fleet, that there is no possibility of Japan bringing war to our Pacific shores while American ships float in Pearl Harbour.

But the whole trend of Axis strategy is away from such forthright blows at major opponents. If the United States is attacked in the Pacific, it will be by some method that attempts to reduce us to a passive defence in those waters. An advance by the European Axis powers along the line of the Spanish Canaries and Portuguese Cape Verdes towards South America might be arranged to call the American fleet into the Atlantic; so might a seizure of Dutch Curaçao.

A passive defence in the Pacific could still be made good against invasion. It would take months, if not years, to reduce Hawaii alone and other months to recondition it as a Japanese base. It is not the validity of such a defence but its entail that would disturb us. A passive defence would involve Japanese domination of the Eastern seas. Americans would have to do without rubber (there might be enough for military purposes, but nothing left over), and without all the articles made of rubber; without silk or pineapples, without tea, without tungsten for electric light filaments and alloy purposes. Sugar would rise in price. There would be a shortage of tin for the cans in which foods are packed, of the fibres from which rope is made, of many drugs, of wool for our clothes. There would be financial difficulties attendant on the loss of all Eastern investments and desperate poverty in the South, where the cotton farmers would lose over fifty per cent of their market. There would be terrifying and destructive air and submarine raids from Hollywood to Seattle. Finally, there would be a serious loss of morale in the American fighting forces, which are at their worst on passive defence.

In short, passive defence in the Pacific would bring privations which every American citizen would feel every day and in the most painful manner. No American government could afford to subject the country to such a prospect. And in a Japanese-English war, a successful Japanese offensive towards Singapore would bring to America results almost as grinding. This is why Japanese military (or naval) success against England in the south seas must almost inevitably drag us into war.

II

The United States on attack in the Pacific is much better situated than Japan. An offensive along the northern line, by way of the Aleutian chain stands little chance of success. It would involve providing docks for big ships at Dutch Harbour, where none now exist. The same base would have to be supplied with food and fighting material for the 150,000 men of a war fleet. When this was all done and the advance towards northern Japan made, the offensive would still cut no Japanese supply line not already destroyed by the mere advent of war. A blockade of Japan, even of the Japanese cities facing the Pacific, from Dutch Harbour is not to be thought of. The distance is 2,500 miles.

The southern route through the islands is another matter. Guam, Wake, Midway, and the Philippines would still fall to Japan at the first shock. But with Australia our ally, we could practise against Japan the same strategy of distraction that the Axis contemplates against the democracies. With or without Australian help we could recover the islands and take the Japanese Carolines. Indeed, we would be forced to this step. Let us see what it means:

It means maintaining a steady stream of expeditionary forces through Hawaii, 2,000 miles from San Francisco, and from Hawaii to the Marshalls and Carolines, another 2,000 miles. It means protecting the passage of supplies along this same long route from aeroplane and submarine attack. It means the separate conquest of every little palm-fringed atoll that could furnish harbourage for a submarine or a landing-spot for an aeroplane; and at every step, fighting of the most desperate character known to history, for the Japanese

are as admirable on defence as the Americans on attack.

In the long run the result would be fairly certain. Japan is crushed, cut off, when the United States joins hands with Australia through the islands, or without Australia, can send cruisers freely to the China coast.

Before that moment arrived Japan would be forced to surrender or to meet the American fleet in a stand-up battle for the supremacy of the Pacific. The point to be noted here is that this battle would take place at the moment of Japan's choosing and at the point most favourable to her. The greater fleet speed of the Japanese Navy gives it the privilege of fixing the place and hour of combat. This is the reason (one reason) why American battleships give so much of their tonnage to guns and why they receive the heaviest armour in the world. In any possible battle they will be utterly alone in the ocean.

III

In the Atlantic, American sea power is faced by three problems, two of them related to the British Empire. Western Canada is not a matter for deep American concern. It touches the sea for only a short distance between the long foot of Alaska reaching south and the great American naval base on Puget Sound. It is as effectively covered by the Aleutian and Hawaiian bases as the California coast itself.

But on the Atlantic the case is different. Canada has a long, vulnerable, indented coast-line, with no defence but that provided by a courageous but small and inexperienced militia army. In the event of a British defeat in Europe, a possibility which cannot be neglected, this would be an obvious point of attack for any European

power or coalition attempting adventures against the United States. Seventy-five per cent of our heavy industry, our financial and administrative centres, lie within a few hours flying radius of southern Canada. The fact compels the American Navy to consider the defence of the Canadian coast, a demand made more importunate by the present weakness of American army air bases in the north-east and the general poorness of military communications in the Canadian region opposite.

British also are Bermuda, only a little farther than the Canadian airports from the great American cities, and the Bahamas, close off the coast of Florida. The history of what happened to Barcelona under the bombers from the Balearics illustrates what Bermuda means; the Bahamas flank the most nearly vital of all American shipping routes—that to the Gulf of Mexico and the Panama Canal from our east coast. These points therefore fall into the list of those for which the U.S. Navy must provide a second line of defence in America's own interest.

The other side of the picture is that the British defeat in Europe which would make Canada, Bermuda, and the Bahamas danger-point, would at the same time cause these places naturally to fall into the American orbit. All are at the very limit of the operating radius of any fleet from Europe. (The range of European war fleets for operating purposes is something less than the 2,500 miles of the Pacific navies.) All would make admirable bases for the powerful American air force and for the fifty or more submarines now in reserve, the older vessels, which would still be quite capable of operating along the Halifax-Bermuda-Nassau circuit.

Of the British bases on the Atlantic only Halifax would

be any use to U.S. naval vessels, and that is already doubled by near-by Boston. Neither Bermuda nor Nassau has a dock big enough to take any U.S. warship above the size of a destroyer.

Behind the light forces permanently on the Atlantic coast the United States has three older battleships (*New York, Texas, Arkansas*) no longer fit for the line of battle; a few of the older light cruisers, a few of the very new light cruisers not yet shaken down into form to join the fleet, one carrier, and a number of the older destroyers. These forces could hardly fight a battle-fleet, but they should not be considered in that light. They are raider-protection, and admirable for the purpose, when it is considered that they will have the support of American air power, overwhelming within a zone of operation extending nearly a thousand miles beyond our shores. In the event of a first-class invasion approaching the American coast, they are also capable of winning enough delay for the battle-fleet to arrive from the Pacific.

The only difficulty is that most of the shore-defending aeroplanes belong not to the navy but to the G.H.Q. Air Force of the army. The first efforts at joint manœuvres have not been too successful, G.H.Q. Air Force and navy each tending to work along its own lines without paying much attention to what the other is doing. But the experiments are to be continued; by the time tomorrow's war arrives, it is probable that the two forces will have worked out some method of co-operation. The United States thus may be said to possess security in the North Atlantic as well as in the Pacific against any event but a sudden and crushing British defeat.

IV

The danger is farther south, along the lines of the Caribbean, an area as vital to the United States as the Bristol Channel to England. The Caribbean-Gulf of Mexico system is important in itself. It covers American raw materials lines to Brazil, which either in the first instance or as a reserve source, furnishes us with nearly all the requirements not found within our borders. It is the corridor both of our North-Gulf traffic and of the Atlantic-Pacific trade, which together account for more than half of America's seaborne carrying business.

Most important of all is the fact that the Caribbean is the gate through which our fleet passes between Pacific and Atlantic. It is, as we have seen, practically impossible for any Pacific enemy to approach the canal in force until the Gibraltar at Pearl Harbour has been disposed of. But on the Atlantic side the case is by no means so favourable. The Caribbean coast of South America is rich in good harbours that could be erected into permanent or temporary fleet bases. The islands have many more. Several of these harbours belong to weak nations (Colombia, Venezuela) that might easily fall under European domination. Several more belong to England and France, and would presumably be objects of attack from the Axis under any war conditions that gave that combination strength enough to attempt overseas expeditions. Two of the very best harbours, Paramaribo and Curaçao, one just outside the Caribbean, one holding its inner gate, belong to weak Holland, already marked as an objective of Axis strategy.

Both points are within easy range of Colón, at the Atlantic end of the Panama Canal. Curaçao is within range of the Florida Straits, the passages through the

Antilles and the Gulf. Both have behind them immense sources of supply in South America, which can furnish anything a warring navy needs save munitions. From Curaçao aeroplanes could dangerously raid American traffic and submarines make the whole southern route unsafe. An attack from this direction would require the shifting of the fleet to the Atlantic at any cost, and the cost might be severe if the enemy had acquired his Caribbean station before our fleet arrived on the scene.

Moreover, European powers do not have the problems of fleet range in attacking from the south. Spain—Spanish Morocco—the Canaries—the Cape Verde Islands form a series of stations giving Europe access to South America by easy stages and at points far removed from the line of attack of the United States forces defending the North Atlantic. The strategy of the Axis in an American war is thus marked. Essentially, it is a variation on the normal method of diversion. In detail it would consist of a Japanese feint towards our west coast to hold the battle-fleet in the Pacific, followed by an advance on the part of the European Axis powers along the South American—Caribbean line. They might even get a fleet in along this line in time to damage the American warships at the Canal severely enough to chance a battle for the Caribbean.

The American bases at Norfolk and at Guantanamo in the base of Cuba, the base for light craft now building at Porto Rico, ensure that the northern passages through the great circle of islands enclosing the Caribbean can be shut to any foreign advance. But the southern entrances, the passages leading to Curaçao and the Venezuelan coast can, in the absence of our battle-fleet, only be held by light forces—aeroplanes and submarines—and by these not very effectively.

We have no bases beyond Porto Rico and the Virgin Islands (which are practically units of a single establishment) and neither of these is at present fortified. Moreover, Porto Rico and the Virgins, though excellently adapted to submarines, are bad for aeroplanes. The Hepburn Board, which reported on American air bases in the winter of 1938, pointed out that the harbours at both places were open to heavy ocean swells that make it extremely difficult for the big patrol 'planes to take off and to land.

In short, we are secure in the Pacific, with or without the fleet, though we might be severely hurt there in its absence. We are secure in the North Atlantic while the British Empire stands and perhaps even if it falls. But in the Caribbean, despite the massive fortifications at Coco Solo covering the Canal, despite the nearness of Norfolk, we are not secure without the presence of the fleet, and perhaps not even then. For even the fleet in the Caribbean does not make certain our supply lines to Brazil.

v

The Monroe Doctrine thus has a strategic as well as a political meaning. We are required to defend the Dutch West Indies and the states of eastern South America, as we are required to defend Canada, in the interests of our own security, whenever these places are menaced by a European nation or combination having sea power at its disposal.

Of European advance through Venezuela or Colombia there is little immediate danger. Neither can be directly reached from Europe without passage through the American held portions of the Caribbean. The intermediate steps to both are the same as those to the

downright attack on American interests in the Caribbean, that is, through Argentina, Uruguay, and Brazil.

The last three nations are the ones we must consider and it becomes pertinent to ask how far they are capable of defending themselves. Uruguay has no navy to speak of, but she is, strategically, relatively unimportant. She could give an invader of the American continents nothing but a taking-off point for attack on one of the larger powers and may be neglected save in connexion with them.

Argentina has a small, relatively efficient navy, whose chief defect is that the ships, built in the foreign yards of many different countries, do not combine well. Sailors who have learned the mechanism of one ship find their experience of no value on another. The fleet is headed by two American-built battleships, now old but still capable of taking care of themselves in the presence of anything but a modern battleship of the first line. There are the two Italian-built heavy cruisers, fast, but light, under-gunned and rickety. There is one light cruiser built in England, a new and good ship mounting nine 6-inch guns behind strong protection. There are seven fine new destroyers, also English-built and duplicates of the latest British type; five older but still very useful heavy destroyers built in Spain, and three good Italian-made submarines. The Argentine naval aviation service is all right. The country could put up a good resistance, and it would take something like a first-class effort by a first-class power to beat it down.

Brazil's case is not so happy. She also has two battleships, but they are the smallest and probably the weakest in the world, and two antique light cruisers, not much more powerful than a modern destroyer. There are three destroyers building in native yards from American

designs and with some American parts, and six building in England; three small and one very large and good Italian submarines. The fleet is sensibly less strong than Argentina's and the Brazilian situation is further complicated by problems of personnel. The officer class produces some extremely capable naval thinkers and writers, but few executives with drive. It is probable that the Brazilian Navy gets less sea practice than any service of its size in the world.

The problem with regard to the enlisted personnel is a facet of that which agitates Brazil as a whole—the racial question. Neither whites of European ancestry (who furnish the bulk of the officer corps) nor Indians, nor negroes provide enough men for the fleet as a whole. When mixed under the conditions of naval service, as the three races now are, they do not get along well together. Discipline, morale, and efficiency all suffer.

Both Argentina and Brazil have established dockyards in the homeland and have made a beginning of building their own warships. Neither has yet produced anything but a few minesweepers. From the point of view of the United States this is probably just as well. The Axis method of penetrating these South American countries has thus far been that of commercial and ideological attack. This has not been particularly successful, especially in Brazil, the state the Axis would most like to gain, but there is always some faint chance of an armed dictatorship turning its weapons against the United States.

VI

In the meanwhile, it has become an American responsibility to see that the inimical foreign powers do not gain a military foothold in Brazil from the sea. What does this mean?

In the first instance it means that an Axis expeditionary force approaching Brazil would have to be beaten off by an American battle-fleet operating from Belem or Pernambuco. Even Guantanamo and San Juan, Porto Rico, are too far from the scene of such an operation to afford good bases for it. But the use of Belem or Pernambuco makes necessary the transport of essential supplies all the way from the United States down a long, vulnerable line of communications, with difficulties at least as severe for the Americans as for the attackers. Attack by way of Brazil thus already gains the enemy equality of logistics—the science of military supply.

But it also gains more than this. A United States fleet off the coast of Brazil is in no such shape to rush back to the defence of the Pacific against Japan as one operating in the Caribbean or the North Atlantic. Conversely a fleet facing Japan in the east would take weeks to get back through the Canal and meet another enemy off Brazil—perhaps too many weeks.

In the second possible case, that of a Brazil turned inimical or a Brazil in enemy hands, our defence line is driven back at once to the Caribbean; that sea and the Gulf of Mexico behind it are full of enemy submarines; Curaçao and the Venezuelan ports become points of the most dangerous importance. In fact, all the factors so favour this line of operations that we may be sure a European enemy attacking the United States will begin by attacking Brazil.

In the meanwhile the possibility is fairly remote. The Axis powers, the only ones who have reason or desire to engage the United States across the wide belts of ocean in which our battle line swims, must first dispose of England and France. Whatever one may think of the governmental morality of these nations, it is unlikely that

the Axis will dispose of them by negotiation. It would be no more to England's comfort to see the Axis established in the United States than to ours if the Axis gained a foothold in Canada. To dispose of England and France by force of arms the Axis must first do something about the British Navy. It may do that with the help of Japan; but the entrance of Japan is likely to bring the United States into the combination.



XIII

NEW WEAPONS

THE SUBMARINE.—Both the submarine and the means of defence against it have advanced so rapidly since the World War that it now constitutes practically a new weapon of uncertain possibilities. Italy at least thinks highly of these possibilities and Russia so highly that she has been trying to use the submarine as a cheap substitute for sea power.

How far does this advance extend, and what are these possibilities? The submarine has more than doubled its surface cruising range since 1918 and more than tripled its underwater cruising range. On the surface some submarines have taken full rank as blue-water cruisers, the French *Surcouf*, for instance, running to a cruiser's tonnage and a pair of 8-inch guns.

Beneath the water the submarine has borrowed one of the weapons formerly used against it—the underwater listening device. With this aid submerged submarines can do things never before dreamed of. They can locate enemy ships at a considerable distance, manœuvre in formation, launch torpedoes on a true course without ever coming up to as much as periscope depth. Lying in wait in narrow waters which guarantee the route of approaching ships the submarine is thus more formidable than ever. This is especially true when the approaching ships are in number—a fleet or a convoy—whose own propeller noises mask the fainter beat of the submarine's driving apparatus. It may also be assumed that attacking aircraft will not infrequently co-operate with submarines, driving off the greatest enemies of these crafts—blimps and such slow-going aeroplanes as the autogyro.

The improvement of the submarine's internal structure to make it more resistant to depth-charge attack has also been carried far. But nothing has been done, nothing can be well done to protect submarines against mines. Mines sank almost as many submarines as all other causes put together during the World War. It is likely they will do quite as well again in any war in a field that makes mining operations possible. They are not possible, for instance, in the Caribbean and its passages, where the water is too deep.

The submarine has also to face listening devices far more efficient than those of the past. A great deal has been learned about sound since the World War. The vessel hunting a submarine nowadays does not always have to wait for the latter to start her engines. She can emit sounds from her own diaphragm apparatus and by the quality of the reflected noise tell whether such a metal object as the hull of a submarine is near.

Nor does there seem to be very much the submarine can do about aircraft in regions where command of the air, permanent or local, belongs to the other party. It might also be mentioned that the British, French, and Japanese navies all now include special net-laying ships, which would seem to indicate that a good deal of success has been achieved with this form of barrier.

The general probabilities would thus seem to favour something like the reversal of the conditions obtaining during the World War, when the submarine danger-zone was along the coasts and the open ocean fairly clear. To-morrow's war will see coastal shipping lanes heavily patrolled by aircraft and listening ships, heavily protected by mines. In blue water the mines cannot be laid, the listening ships fail through their own movements, and the aeroplanes do not know where to look. °

The oxo-hydrogen motor.—When Germany threw over the clauses of the Versailles Treaty that forbade her to have submarines and announced that she had already built the Weddigen flotilla, she also announced some of the characteristics of the new boats. They had the extremely low tonnage of 250; it was explained that efficiency in such small craft had been obtained by the re-combination of oxygen and hydrogen which had previously been electrolyzed from sea-water.

The ordinary submarine has to have two complete motor installations; Diesels for use on the surface and electric motors working from clumsy and dangerous batteries, for use while running submerged. The new method set the naval technical world by the ears; if it worked the way the Germans said it did, it would eliminate one of the two power plants and at the same time do away with the batteries that cause so many submarine accidents.

Time and further information showed that the wonderful new motor was not quite all it was cracked up to be. Instead of an entirely new set-up it turned out to be the conventional Diesel. Under water, instead of using the free air of the surface, it was fed with a mixture of oxygen and hydrogen produced by the electrolytic press. But the gases had to be stored in enormous flasks under high pressures; the method of storage and the handling of the highly explosive gases was as dangerous as the batteries in a different way. The flasks actually absorbed more space and weight than the electric motors they replaced, and in addition a condensing apparatus was found necessary to get rid of the steam which was the waste product of the engine while running submerged.

Later classes of German submarines have been supplied with the conventional Diesel-electric motor set-up. They

may get the oxo-hydrogen power plant in shape to work some day, but it will not be to-morrow.

Atomic power.—The scientists at M.I.T. in Boston, where they have a cyclotron, or atom-smasher, claim to be within measurable-distance of realizing the dream of tapping reserves of power within the structure of the atom. Under the impulse of war needs, which always apply such a spur to invention, they might conceivably make it.

But even if it comes the effect on naval warfare would be slow and not quite as profound as imagination likes to picture. The greatest result would, of course, be that of giving every ship so powered unlimited cruising range. 'Atomic power' would not be power itself, but heat—vast reserves of heat from an insignificant quantity of combustible material. A warship using atomic power would still find boilers and engines necessary; it could dispense with nothing but the present fire rooms. There would not even be much saving in weight, for an atom-smashing machine is a cumbersome and weighty device.

Thus no very small ship, such as torpedo motor-boat or submarine could use the new source of power, and it might be limited to battleships, carriers, and large cruisers. For ships of these classes it would take a good deal of time to install. Ships would either have to be taken off duties on which they were urgently needed to make the installation, or it would have to wait to be built into new craft.

The death-ray.—Similarly disappointing when viewed at close range is that great favourite of all sensational writers, the death-ray. A death-ray has been produced that will kill a mouse at three feet. It is a development of the extreme short-wave radio device used in some laboratories to create artificial fevers.

It might be possible to build a death-ray that would kill a man or at least give him a severe headache. But the present ray will not work on the mouse at four feet; the emanations simply disperse till they have lost too much of their strength, and no way of preventing this has yet been discovered.

Besides, even to kill a mouse, it requires a big installation and such quantities of electric current that by time the ray was built up to man-size, it would be a great deal cheaper and easier to shoot a man with a 16-inch gun or to blow him up with a ton of dynamite. Anything more practical seems a matter of centuries in the future.

The death-ray that stops aeroplane motors is another great feature-writers' favourite. Such a device has been produced, operating against an aeroplane's sparking plugs at some distance. But it has the same weakness as every other device of the kind, present or prospective; that is, it is comparatively easy to screen out; can be rendered totally ineffective without in the least decreasing the engine's power.

Invisible smoke.—In Germany and the adjacent countries much has been made of the possibilities of 'invisible smoke'. This is another anti-aeroplane device, consisting of emery or metallic powders divided to almost molecular fineness, contained in shells and fired by guns to great heights. On the shell bursting the air is filled with this powder so fine as really to be invisible, and the smallness of the particles ensures that they will hang in the air for a long time.

Emery, drawn into the motor of an enemy aeroplane flying through the 'infected' area would quickly grind down the pistons and cylinders—quickly enough to make the motor perish of old age within a few minutes.

The accompanying metallic dusts would choke the carburettor and bring the 'plane down. The area into which invisible smoke-shells had been fired would thus become temporarily impassable to all aeroplanes.

There is no difficulty about dividing the materials to the fineness necessary to get them to float. Neither is there much doubt about the effectiveness of a properly placed invisible smoke barrage; it would stop any aeroplane all right. Also, unlike the death-ray, it is extremely difficult to screen out. A filter fine enough to hold up the invisible dusts would greatly hamper an aeroplane engine; set it gasping for breath, especially at high levels, and greatly cut down its power yield. If the 'plane carried oxygen in tanks instead of using the air, it would cut down the useful load.

But there are two difficulties about the invisible smoke system, so serious as to make it doubtful whether it would be used at all. In the first place, invisible smoke denies the air to friendly as well as foreign 'planes. In the second, what goes up must, ultimately, come down. Under naval conditions the dusts of invisible smoke would descend in a deadly rain about the ships that fired the material. Warships have many metal joints and moving parts that depend upon the most exquisite mechanical adjustment, especially in the gun and turret mechanisms. If invisible smoke got into them (and it could hardly be screened out) it would cut them down as rapidly as the pistons of an aeroplane.

Artificial fog.—Almost all the sea powers, on the other hand, have been energetically and successfully pushing forward the use of visible smokes. They now come in black, white, and colours; can be used by night or day; will hang in the air in long thin curtains or lie on the water in huge flocculent masses during any weather

short of a full gale. They are bound to play a prominent part in any future naval battle.

Nevertheless, they will hardly make all torpedo attacks successful as is sometimes claimed. Destroyers attacking under a smoke-screen are invisible, but so are their targets, and given the speed of modern warships, the target is likely to be somewhere else by time the torpedo-carriers get through the cloud to release their trainloads of dynamite. The fact that modern naval guns fire so much faster than the old also plays a part. All shooting in a practical sense, is now barrage fire, aimed not so much at a target as at a point the target must pass. That is, it is perfectly possible for ships defending themselves against a torpedo attack to lay down a line of exploding shells so rapidly delivered and so close together that the torpedo-carrier can hardly escape damage, perhaps crippling damage.

The rocket.—In 1929-30 societies for promoting research into rocket flights to the stratosphere and perhaps even to the moon were founded in England, France, the United States, Russia, and Germany. They exchanged information and made considerable progress in research into the basic problems surrounding rocket flight. Save for the isolated effort of Dr. Goddard in America, German investigators were clearly in the forefront of the movement. Fritz Opel gained much publicity from a rocket-powered car which ran violently and explosively round a track, and an Austrian investigator named Reinhold Teiling flew a bag of mail from Salzburg to Vienna by rocket.

With the coming of Hitler the German rocket scientists ceased to correspond with those in other countries and their experiment stations were taken over by the government. Presumably the experiments have been

continuing under government auspices. It is doubtful whether they have yet succeeded in getting a rocket that will do as a projectile; doubtful whether they will for many decades to come, for the solution of the ballistic problems of the rocket is an extremely arduous problem. As for rocket-powered vehicles, including aeroplanes, they are under present conditions either toys or impossibilities. At speeds below that of sound the rocket is mechanically inefficient and almost impossible to control. But to reach a speed above that of sound the rocket must have an acceleration that would kill any human being. The solution of the difficulty thus lies long in the future if it exists at all.

Improvised aircraft-carriers.—In all past wars armed merchant vessels have played a role as auxiliary cruisers. But in the World War there was a noticeable falling off in the use of this form with reference to previous conflicts. After the first few weeks the only armed liners seen were a few British vessels of the 10th Cruiser Squadron on the patrol between Scotland and the Norwegian coast.

A still greater falling off is likely in the next unpleasantness; and it will be the product of technical factors. The speed of warships jumped very largely between the American Civil War and the World War, and it has advanced again since the latter, while the speed of commercial ships has advanced relatively little. The total result is that only the biggest and fastest liners have speed enough to be any use as cruisers, and these big liners cannot carry anything like the armaments that would be justified by the enormous investment in crew and upkeep.

But every nation now has three or four such monster ships as *Normandie*, *Conte di Savoia*, or *Europa*. The *de luxe* passenger traffic for which they are designed ceases

with the declaration of war. As cargo-carriers they are inefficient; as targets peculiarly vulnerable by reason of their size. There would be practically no use for them in wartime except as auxiliary aircraft-carriers. But they could be used for this purpose quite easily. The removal of partition walls in the upper saloons and cabins would provide plenty of room for 'planes. The funnels, which are both larger and more numerous than necessary in all big liners, could easily be trunked out to the side and the top-hamper cut away.

Could they be made into carriers quickly enough to be any use? Naval building men say such a ship as *Queen Mary* could be turned into quite a good carrier in a year, provided the building yards were fairly efficient. Provided also that the parts and fixtures for the ship's new employment were not ready at the time. If everything were ready and the ship could be put in hand at once, the time would be cut to something like six months. In Germany at least, where so much attention is given to armament, it would seem likely that the conversion materials would be ready for some ships.



XIV

THE CHARACTER OF A NEW SEA WAR

THE POSSIBILITY OF CONVERTING big liners into aircraft-carriers naturally brings up that of their strategic and tactical employment in the next war. What would they be used for and how much use would they be?

English and Germans would find them most useful. In England's hands one can well see them as flagships of big ocean convoys, with their 'planes perpetually out patrolling the sea routes, a few smaller ships accompanying to protect them against raiders using the gun as their chief weapon.

In German hands they would be obviously good as anti-blockade raiders. Such an improvised carrier, in the centre of a squadron of heavy cruisers and destroyers, falling on a blockade line at dawn or dusk, could make things exceedingly warm for the blockaders. Nor would such strokes be dangerous alone for the direct damage they inflicted. Chiefly they can be used as a means to the end of shaking loose commerce-raiders—small auxiliary carriers, small cruisers, big submarines.

For everything points to the conclusion that tomorrow's sea war will have one outstanding new characteristic. It will be marked by attacks on commercial shipping of a violence and persistence never before seen. This is not only because modern war has become so deeply a matter of technics, of seeking supplies of essential raw and manufactured materials. The balance between gun and armour, attack and protection, has been fairly well maintained in warships. But the commercial ship has not increased her powers of resistance.

Relatively to the powers of the weapons brought against her, that resistance has, in fact, enormously declined. During the war, for instance, *U-152* intercepted the transport *Ticonderoga*, returning empty, and sank her by shell-fire. It took all afternoon to do the job, but it would not take that much time to-day. That is, it is much easier for a warship of any class to sink a freighter, liner, or tanker, than it was in the days of the World War.

At the risk of wearisome repetition, it is necessary to insist that the whole strategic and tactical policy of the Axis seems constructed around the destructive powers of the modern warship as against commercial vessels. The heavily armed German aircraft-carriers—the vast shoals of Italian submarines, the fast, powerfully armed but unprotected *Condottieri* cruisers—all are terribly formidable against commercial shipping of any and every type.

War in the Mediterranean would thus have two distinct phases. The first phase, beginning with the declaration of war, would see Italian aeroplanes and torpedo craft abroad all through the inland sea, violently attacking British and French commercial shipping, with especial attention to French troop and supply transports from Africa. The western allies would lose terribly, there would be a sudden world-wide demand for bottoms and an unprecedented shipbuilding boom in the United States and Scandinavia. There would be minor actions, momentary contacts all over the Mediterranean area, distinguished by aerial combats of great violence.

The second phase would begin with the inevitable closure of that sea to British and perhaps to French commercial traffic. This second phase would be the Anglo-French counter-attack—if the war lasted that

long. Germany and Italy continue to talk about ending any war in the first rush.

Undoubtedly the Anglo-French alliance would attempt to establish a barrage of nets, mines, ships, or all three from Bizerte to Malta, shutting off Italian access to Libya, and above all to the Dardanelles through which the oil from Roumania and the Caucasus must come. If Malta fell or were so reduced to a pile of ruins that it could not be used as a base for light craft, the counter-attack would come from the British Eastern ports. In either case this would be a phase of light raids and partial battles on the surface of the water; battles fought by night or under blankets of artificial fog, affairs of small ships, making contact and losing it again in five minutes.

In either phase a sea battle might fall. It might take place early and in the East if Italian air power succeeded in crippling two or three of the British battleships in the Eastern Mediterranean. They need not be sunk; merely hurt enough to put them in dock for a few weeks. Under these conditions it would become imperative for the Italians to engage what was left of the English fleet in that quarter before it could be reinforced or the damaged ships got out of dock—that is, while Italy held the advantage. In short, it is Italy's obvious game to provoke incidents and accidents that might injure English capital ships and then to fight them.

Given the psychological characteristics of the two navies the Italians would probably get their naval battle if they came looking for it. After twenty years of criticism of their too great caution at Jutland it is likely that English leaders would leap to the extreme of daring, even against odds.

An Italian-French naval battle in the West is less

likely; Italy has nothing to gain by it unless forced to it as an act of desperation. A German-English naval battle in the North Sea is least likely of all.

II

War in the South Pacific would also be a business of commerce attack and protection, but on an entirely different basis. The mosquito craft for which European waters are so suited find little employment here. It would be an affair of long trains of merchant ships in convoys prohibitively big for the narrower waters of Europe, guarded by cruiser squadrons and attacked by ships of similar type or by giant cruiser submarines. The South Pacific and Straits of Malaysia are not adapted for mining operations; there would be less of this than in Europe; less destroyer work; less use of smokes, fogs, and gas; less use of aeroplanes as striking instruments and more use of them for scouting and patrol.

To win here Japan would probably have to carry out an overseas expedition with troops, sooner or later. Against what point? Singapore would be a tough nut to crack and the approaches offer great difficulty, but Japan has never before shied off from attacking strong positions, and could probably use against Singapore some base in her puppet ally state of Siam. Against the Dutch islands? They would make admirable advanced bases for Japan against England, could she win a foothold among them, but that would only transfer the destination of the final expedition one step. Against Australia? It would be defended by a small but prodigiously good army, and a Japanese expedition against Australia would offer almost insuperable problems of maintenance. Against Hong Kong? Almost certainly,

but that again is a first step. Against the French establishments in Indo-China? Providing France were in the war, they would certainly have to be overcome before Japan could venture farther south.

War in the North Pacific would still lean more heavily to cruiser operations, surface and sub-surface. We could confidently expect to see Japanese submarines operating off the Pacific coast, shelling unprotected cities in quick raids and sinking coastal steamers. Japanese cruisers and small carriers, either warship-built or converted merchant vessels, would be there too if they could make it through the American patrols. Japan has numerous quite small but fast passenger liners; they would undoubtedly be armed and sent against American commerce, perhaps into the Atlantic by way of Good Hope or Cape Horn.

On the other hand there would be American striking forces in Japanese waters all the time, perhaps a permanent or semi-permanent squadron maintained off the Malay Straits. The American battle-fleet, based on Hawaii, would be hunting, hunting, constantly seeking that general fleet action in which the strength of the American battleships could be brought to bear.

III

Whoever the combatants, it is unlikely that tomorrow's war will see more than one naval battle between any pair of them in which ships of the first line are engaged. In the days of Admiral Nelson the great sea powers could, and did maintain as many as 120 battleships apiece, scattered in several fleets. Two of these fleets might meet to-day, two more six weeks from now. After a battle the defeated party took what ships he had left back to port. In six months or a year the

produce of his building yards enabled him to face the same enemy on the seas again.

All this has utterly changed. The modern battleship is not only such a complex and expensive article that only a few of them can be maintained by the richest nations. Under the influence of the doctrines of Mahan, now accepted throughout the world, battleships are always concentrated in one main fleet. And it is also, within the duration period of a modern, fast-tempo war, an irreplaceable article. No nation can expect any reinforcement of its battle line during a conflict save from ships already well towards completion when the struggle began.

This gives the individual modern battleship a proportionate value far beyond that of its wooden predecessor. It substitutes caution for daring aboard flagships and makes permanent the condition that faced Jellicoe at Jutland, where he was 'the only man who could lose the war in an afternoon'. It is practically a guarantee that the iron giants of the line will not be brought into battle save in one of two cases. If both sides imagine they have some decisive advantage unknown to the other they will fight; they will fight if one side is caught in a trap where it cannot escape but by fighting.

Neither of these is impossible in to-morrow's war. Both were seen during the Russo-Japanese War, for example. During the fighting off Port Arthur in the early days, the Russians had a material superiority, but the Japanese knew themselves for better gunners and tacticians, so they fought. The battle of desperation took place when Togo caught up with Rodjestvensky off Tsushima. We have already examined some of the circumstances that might produce a battle of mutual confidence in the Mediterranean, the most favourable

of these being the case in which for one reason or another a British or French fleet is inferior in numbers to an Italian, but still willing to fight. The battle of mutual confidence in the North Sea is unlikely because of the accuracy of the German figures. The battle of desperation would take place there only in the event that the British were the desperate party.

In the South Seas a Japanese-English battle of mutual confidence is not at all unlikely if the fleets are any thing like equal. The Japanese, brave, self-confident, and ingenious, are the most willing of all nations to stake their chances of success on some tactical or technical trick. But even they would hardly engage the United States fleet in anything but a battle of desperation; the material superiority is too great.

As to the specific character of to-morrow's great naval battle, all the nations have been conducting their practice at extreme ranges—30,000 yards and more. However good the aeroplane observation and range-finding instruments, hits are necessarily few at such distances. An element of prediction is introduced; between the time the shell leaves the gun and the time it reaches the target, that target will have moved a considerable distance, perhaps not in the direction the observers expected.

It is for this reason that many well-informed naval men predict an entirely new and more open system of tactics during the next big naval battle. For many years in the past the close column has been considered the only possible battle formation, the only one that will enable all the ships of a fleet to develop all their gun-power in the most effective manner. This close column consists of battleships, steaming along at top speed or somewhere near it, with the intervals equal to the length of a ship.

" But with modern big guns firing three or four times a minute, with modern battle ranges turning practically all fire into barrage fire which, if it misses one ship, catches another; conditions demand something more open and flexible. Perhaps this would be a very widely spread line, perhaps not a line at all in the old sense, but each battleship running far behind the one before it, the centre of its own little troop of destroyers, destroyer leaders, and aircraft.

Yet the naval men may be all wrong about ranges. They were all wrong before the World War, when they expected ranges of the order of 9,000 yards and got them upwards of 20,000. Battle ranges depend ultimately upon weather and visibility; and still more upon the kind of battle being fought. Even in the battle of mutual confidence, portions of the line are certain to be shrouded in smokes temporarily as ships get hit and seek respite from too-accurate enemy fire, or work towards surprise manoeuvres, or hide from aerial attack.

The battle of desperation, by its very character, will be shrouded in obscurity as dense as the weaker party can make it; for obscurity produces accident, and only by accumulated accidents can that weaker party hope to reverse the balance against him. Particularly in European waters this invisibility is likely to bring the ranges down to 8,000 or 9,000 yards, distances at which every shell will go right through the plates, but where there will be opportunity to fire only a few shells before the clouds shut down again.

But in any case, only one such battle. One will be enough.

